The RUBBER AGE

VOL. 26, No. 5 DECEMBER 10, 1929

Late News of the Rubber Industry

Dayton Rubber Considering Branch Plant in California

ALTHOUGH no definite plans have as yet been formulated, the Dayton Rubber Manufacturing Company, Dayton, O., is reported to be considering the feasibility of establishing a western branch factory in the vicinity of Los Angeles. Newspaper dispatches last month stated that actual steps were under way for the construction of a $4,500,000 plant in California, but this has been denied by company officials.

"It is true," John A. MacMillan, president of the Dayton Rubber Manufacturing Company, said on Nov. 18, "that a branch plant on the west coast may develop with the growth and expansion of our organization. We have no immediate plans for such a plant, and we have made no announcement of a definite sum to be expended in that connection." Mr. MacMillan added that a tire manufacturing plant on the Pacific coast was the reasonable way of taking care of extensive west coast tire and rubber goods business and pointed out that other tire manufacturing organizations in Ohio are establishing such branch plants in the west. "At present, however," he concluded, "we feel that we can accommodate our business on the coast most economically through our Dayton plant."

According to earlier newspaper reports, representatives of the Dayton company have been canvassing the coast country for the purpose of obtaining data on factory conditions, living costs, transportation facilities, etc., and half a dozen sites have been under actual consideration. These statements were characterized as "grossly exaggerated and premature" by Mr. MacMillan.

What gave strength to the first rumors that Dayton was considering a western factory was the long term contract entered into with Nelson & Price, Inc., Los Angeles distributors, calling for a minimum of $1,500,000 worth of Dayton tires next year and a substantial increase each year thereafter. The full contract with this firm, which is known as the world's largest retail tire dealer, calls for $50,000,000 worth of tires to be delivered over a period of 22 years. At the time Mr. MacMillan went to Los Angeles to close the contract, it was announced that Frank T. Price, president of Nelson & Price, would become a vice-president of the Dayton Rubber Manufacturing Company.

Los Angeles papers on Nov. 21 stated in connection with the Dayton project, "It was revealed today that five other tire companies were conducting surveys on the worth of Los Angeles as a centre for their Pacific coast production. The companies are said to be the General Tire & Rubber Company and the United States, Fisk, Miller and Ajax Rubber Companies, all of whom have watched the success of the four rubber and tire plants already located there."

Pneumatic Tire Inventories At Lowest Point for Year

INVENTORIES of pneumatic casings and inner tubes at the end of September were at their lowest level for the current year, according to estimates issued by the Rubber Manufacturers Association. Stocks of casings were less than at any time since the end of November, 1928, while stocks of inner tubes were lower—with the single exception of January, 1928—than at any date since December 31, 1925.

Inventories as of September 30 are estimated at 12,875,189 for all pneumatic casings; 13,424,391 for inner tubes, and 147,461 for solid and cushion tires. This compares with the August 31 estimates of 14,225,820 for all pneumatic casings; 14,156,770 for inner tubes, and 156,410 for solid and cushion tires. A sharp decrease is shown from the record breaking figures of 17,957,000 casings at the end of June and 18,928,000 inner tubes at the close of May.

Tire manufacturers in the United States produced a total of 4,757,600 pneumatic casings during the month of September, the lowest output for a full month since December, 1927. Total production of inner tubes is estimated at 5,535,818, the lowest figure for the current year, and total production of solid and cushion tires at 36,936 for the month.

Shipments, although lower than during August, were higher than production. Total shipments during September are estimated at 5,998,363 for all classes of pneumatic casings; 6,249,680 for inner tubes, and 48,167 for solid and cushion tires.

The tire industry is estimated to have consumed a total of 53,308,392 pounds of crude rubber and 18,198,733 pounds of cotton fabric during the month of September in the manufacture of all types of pnuematic casings, inner tubes and solid and cushion tires.

The association's estimates are based on reports from manufacturers who produce approximately 75 per cent of the total for the United States.

Goodrich Now Establishing Chain of Retail Tire Stores

WITHIN the next few months, service stations and tire stores in which the B. F. Goodrich Company has financial interest will assume the identification of Goodrich Silvertown, Inc. Each unit will be one of a number of stores in this newly organized retail division of the B. F. Goodrich Company.

In an address before the first Ohio Management Conference at Columbus, recently, President James D. Tew outlined the purposes of the new retail division and the Goodrich policy toward independent tire dealers. He said that new facts about retailing and better service to motorists learned by a corps of experts in Goodrich Silvertown, Inc., will be made available to independent dealers to aid them in better merchandising.

"We prefer to deal through strong, capable, efficient, financially-able, independent dealers in any locality," Mr. Tew said. "Wherever we have such dealers, and as long as we have such dealers in any community, it is not our intention to establish a company-owned store.

"Goodrich Silvertown, Inc., stores are only set up where we are otherwise unable to obtain adequate retail representation. Where they are established, the manager in charge may be a good dealer—an excellent salesman—who has run into financial troubles solely due to his inability to operate the money end of the business. Or he may be a Goodrich dealer who has made excellent progress in a small way on a side street and we believe that he can do a better job for us and for himself, if established on a main artery with drive-in facilities where he can make his aggressiveness, his selling ability and his personality pay larger dividends."

With less than 100 stores, Goodrich Silvertown, Inc., units are comparatively few when considering the many thousands of tire dealers over the country. But they are located in various parts of the country which makes it possible for the retail organization to study the dealer problems in virtually every corner of the United States and to originate plans for better service and more economical retailing to motorists generally.

Larson Wins Decision in Water Cure Process Suit

A FAVORABLE decision was won in the common pleas court at Akron last month by L. A. Larson, inventor of the water cure process and its several refinements, now largely in use by the Goodyear Tire & Rubber Company, the B. F. Goodrich Company and the Seiberling Rubber Company. Judge E. D. Fritch directed that a journal entry be made denying the claim of Ralph Hutchens, now president of the Gillette Rubber Company, Eau Claire, Wis., to a share in the rights and royalties of the Larson process.

Mr. Hutchens brought suit in May, 1927, two years after Mr. Larson came from Eau Claire to Akron, alleging that by terms of an agreement he was entitled to over $38,000 in royalties said to have been paid Mr. Larson by the Mansfield Tire & Rubber Company, another licensee. The figure of $38,000 represented approximately the total claimed by Mr. Hutchens when the suit was filed, but the actual amount at stake now is said to be in excess of $100,000. Mr. Larsen had worked out the water cure process in Eau Claire where Mr. Hutchens was at the time general manager of the Gillette Rubber Company.

Mr. Larson used the Gillette company's machine shop and other facilities in an effort to perfect a water cure. This occurred in 1923, a time in which the larger rubber plants were still employing a process of rag-wrapping to cure inner tubes and other rubber products. Mr. Larson was successful in devising a curing process and later sold it on a royalty basis to the three Akron rubber companies, the Ajax Rubber Company, and the Mansfield Tire & Rubber Company. He came to Akron soon afterward to supervise the installation of his process in local factories.

His process has since been the target of several suits in county and federal courts. In the present case, Walter B. Wanamaker of the law firm of Wanamaker & Russell, Akron attorneys representing Mr. Larson, brought out at the trial that there was no written evidence of an agreement with Mr. Hutchens. Mr. Wanamaker contended, in addition to the question as to whether or not the statute of frauds would apply, that business men would hardly make a contract of such proportions orally and so loosely. Numerous interrogatories submitted to the court resulted in a thorough examination of the evidence, so that Judge Fritch held that the degree of proof offered was not sufficient and it was, therefore, not required of him to decide the question of law.

October Rim Production Shows Sharp Falling Off

OUTPUT of automobile and other rims during the month of October declined sharply below both the figure for September and the figure for October, 1928. During the past month the number of rims inspected and approved by the Tire & Rim Association, Inc., totaled 1,647,350, as compared with 2,110,003 in September and with 2,114,611 in October of last year.

Total production for the first ten months of 1929 still continues well ahead of the output for the same period of last year and indicates that the figures for the full year will set a new record, even though there may be a let-down in the final two months. The total for the first ten months of 1929 stands at 22,665,254 as against 21,932,844 during the corresponding period a year ago.

The number of balloon rim sizes produced during October was 76.4 per cent of the total output, as compared with a percentage of 80.7 in September. The 19-inch balloon size accounted for 476,727 rims, or 28.9 per cent of the entire October production.

Automotive Rubber Exports Are Higher During October

THE number of American casings exported during the month of October showed a gain of approximately 37 per cent over the figure for September, with Japan taking first place as a destination for all types of automobile tires and tubes. The greater part of October exports, as usual, consisted of automobile casings other than truck and bus casings 6 inches in size or larger. In this class, 211,602 casings were exported with a value of $2,109,504, as compared with September exports of 154,181 casings worth $1,650,785. Of the total October exports, Japan took 19,894 casings valued at $184,934 and was followed in value of shipments by Argentina, Spain and Brazil.

Truck and bus casings 6 inches or over exported during October totaled 27,099 valued at $560,698, with Japan our first customer by taking 4,186 casings worth $86,652. Inner tube exports were valued at $269,357, with Japan our leading market. Other casings and tubes exported were valued at $141,279, automotive solid tires at $82,350, other solid tires at $24,011, and tire sundries and repair materials at $115,959.

The value of all types of rubber boats, rubber shoes, canvas rubber-soled shoes, rubber heels and rubber soles

exported during October amounted to $1,365,594, as compared to the total of $2,073,602 in the record-breaking month of September. As in the previous month, Germany was by far our largest customer for rubber shoes, the United Kingdom for rubber boots, and Argentina for canvas rubber-soled shoes. Canada was the principal destination for rubber heels, while the United Kingdom received the greatest number of rubber soles.

Mexico led all other countries in imports of both rubber belting and rubber hose. Total October exports of rubber belting amounted to $253,028, and shipments of rubber hose aggregated $273,625.

During October, 1,859,869 pounds of reclaimed rubber were exported from the United States with a value of $130,787. Of this total, Canada received 1,306,427 pounds, valued at $92,147. Scrap and old rubber exported amounted to 5,560,876 pounds, with a value of $220,024. Spain was the chief recipient of this commodity, taking 1,973,128 pounds, valued at $85,240, while France was second in rank with shipments of 1,190,466 pounds, worth $54,044.

Rubber Manufacturers' Assn. Committees Plan Activities

A MEETING of the service managers committee of the tire manufacturers division, Rubber Manufacturers Association, was held at the Yale Club, New York City, on November 7 and 8. The preliminary draft of the text for a revised edition of the association's booklet entitled "The Care of Tires for Trucks and Busses" was presented, and it is expected that the new issue will be ready for distribution shortly after the first of the year.

The standards committee of the rubber proofers division of the association met at the Copley-Plaza Hotel, Boston, Mass., on November 20, with a good attendance present. The committee considered the formulation of a standard specification for knitted jersey cloth used in the manufacturer of rubberized raincoat materials. Progress was made and a tentative specification for this fabric will probably be prepared shortly for consideration by the rubber proofers division. It is expected that final approval of the standard specification will have a beneficial effect in insuring maintenance of high quality .

At a session of the accounting committee of the Rubber Manufacturers Association at the Yale Club, New York City, on November 21, the members approved for distribution the cost accounting recommendations or rubber reclaiming plants formulated by the sub-committee appointed for the purpose. These recommendations will be distributed to the industry at an early date and will form a part of the permanent Cost Accounting Standard Practice volume published by the Rubber Manufacturers Association.

As a part of the general discussion, members of the accounting committee exchanged views on the best methods of calculating return on invested capital for specific manufacturing divisions of corporations producing a varied line of rubber products.

Carbon Black Export Association Formed Under Webb-Pomerene Law

REPRESENTATIVES of companies producing more than 92 per cent of the world output of carbon black have formed the Carbon Black Export Association, Inc., a Delaware corporation organized under the Webb-Pomerene law, to promote the rapidly growing interests of American carbon black manufacturers in foreign markets.

Participating in the formation of the Export Association were Binney & Smith Company, representing Columbian Carbon Company, Coltexo Corporation, Keystone Carbon Company and Texas-Louisiana Carbon Black Company; United Carbon Company, including its subsidiaries, Kosmos Crystal Carbon Company; Godfrey L. Cabot, Inc., including Carbon Company, Eastern Carbon Black Company, and Texas Elf Carbon Company, Cabot Company, Cabot Carbon Company, and Gas Products Company; J. M. Huber, Inc., including J. M. Huber Company of Louisiana, Inc., Ebony Carbon Company, Weston Carbon Company, and J. M. Huber Pigment Company; The Palmer Gas Products Corporation, representing the associated carbon black interests of The Palmer Corporation and Electric Bond & Share Company; and R. W. Greeff & Company, Inc., representing Texas Carbon Industries, Inc.

The officers of the association will be Norman Lee Smith of Binney & Smith Company, president; Edmund Billings, Jr., of Godfrey L. Cabot, Inc., vice-president; R. H. de Greeff of R. W. Greeff & Company, secretary; G. A. Williams of United Carbon Company, treasurer; H. W. Huber of J. M. Huber Company, assistant treasurer. They, together with John W. Herron of Palmer Gas Products Corporation, will constitute the Board of Directors.

Carbon black exports have been growing rapidly in recent years, reaching a total, according to the United States Bureau of Mines, of about 78,000,000 pounds in 1928, valued at nearly $7,000,000. Exports for 1929 are estimated to exceed 100,000,000 pounds. Among the principal foreign purchasers are Canada, England, France and other European countries, but distribution is actually world wide.

New York Group, Rubber Division, Will Meet on December 16th

MEETING on December 16th at the Town Hall Club, 123 West 43rd Street, New York City, the members of the New York Group of the Rubber Division, American Chemical Society, will conduct a symposium on the technology of rubber-fabric combinations. This is the third of a series of symposiums inaugurated by the New York Group last March with a meeting devoted to stearic acid and followed up in June by a session on the relative values of natural and artificial ageing.

Following the usual dinner for the members on Monday, December 16, these papers will be read by their authors and discussed by the group:

K. E. Burgess (Richards & Company)—*Technology of Rubber-Pyroxylin Combinations.*

W. L. Sturtevant (Raybestos-Manhattan, Inc.)—*Asbestos Combinations.*

Arnold R. Davis (Firestone Footwear Company)—*Footwear Rubber-Fabric Combinations.*

R. P. Dinsmore (Goodyear Tire & Rubber Company)—*Rubber-Fabric Combinations in Balloon Fabrics.*

R. R. Lewis (Vulcan Proofing Company)—*Rubber-Fabric Combinations in Proofed Goods.*

T. M. Knowland (Boston Woven Hose & Rubber Company)—*Rubber-Fabric Combinations in Mechanical Rubber Goods.*

An entertainment program will also be presented. In the business session of the group, the nominating committee will make its report and officers will be elected for the coming year. Dinner tickets should be secured immediately from W. H. Cope, secretary-treasurer, in care of the R. T. Vanderbilt Company, 230 Park Avenue, New York City.

Carryover of TENNIS SHOES *Not Excessive*

THE initial survey of dealers' stocks of tennis shoes has just been completed by the Rubber Division of the Department of Commerce with the cooperation of dealers throughout the United States. Reports received from 20,948 dealers, covering every State, show their total stock of canvas rubber-soled shoes as of November 1, 1929, amounted to 2,661,897 pairs, an average of 127.1 pairs per dealer reporting stocks.

In this survey dealers were asked to report their stocks of tennis shoes under various price ranges indicated in the table above. The reports show that the average stock of 127 pairs consisted of 45 pairs costing the dealer less than $0.75 per pair; 31 pairs costing $0.76 to $1.00 per pair; 29 pairs costing $1.01 to $1.50 each; 17 pairs costing above $1.50 each; and 5 pairs of specialty oxfords and pumps.

The purpose of this survey, as of the periodical surveys of dealers' stocks of radio equipment, automobile tires, and waterproof rubber footwear made by the Department of Commerce, is to provide information contributing to trade stability in industries where sales are highly seasonal There is a carry-over of stocks both by dealers and manufacturers at the end of every season, and knowledge concerning the extent of the normal carry-over will be provided through this and similar annual surveys, to assist the trade in preventing either scarcity or surplus of supplies. It is believed that the carry-over of tennis shoes indicated by the present survey is not excessive, but a definite idea of the normal November 1 stocks can only be obtained through several surveys.

LARGE STOCKS OF FOOTWEAR, BY STATES

(Including only dealers with over 500 pairs in stock)

	Dealers	Number		Dealers	Number
Alabama	5	4,496	Nevada	—	—
Arizona	2	1,634	New Hampshire	5	3,703
Arkansas	4	3,381	New Jersey	22	17,233
California	25	36,141	New Mexico	—	—
Colorado	2	6,551	New York	62	132,824
Connecticut	10	7,685	North Carolina	7	5,505
Delaware	2	2,380	North Dakota	3	8,537
Dist. of Columbia	2	1,645	Ohio	29	84,615
Florida	6	4,161	Oklahoma	5	5,952
Georgia	5	4,256	Oregon	3	3,219
Idaho	1	591	Pennsylvania	50	75,687
Illinois	27	31,257	Rhode Island	5	9,317
Indiana	11	12,382	South Carolina	—	—
Iowa	8	11,352	South Dakota	2	1,431
Kansas	2	1,098	Tennessee	9	15,563
Kentucky	3	5,658	Texas	19	45,921
Louisiana	2	1,343	Utah	2	3,039
Maine	7	4,870	Vermont	2	1,850
Maryland	10	23,247	Virginia	5	5,457
Massachusetts	30	42,474	Washington	7	4,426
Michigan	20	35,116	West Virginia	6	4,499
Minnesota	12	10,638	Wisconsin	16	11,758
Mississippi	6	7,468	Wyoming	—	—
Missouri	12	30,648	Unallocated	5	3,047
Montana	4	2,804			
Nebraska	5	3,831	Total	487	742,290

NATIONAL CHAIN STORE STOCKS

Cost price per pair to dealer	Total pairs
Up to 75c	134,137
76c to $1.00	44,062
$1.01 to $1.50	28,270
Above $1.50	5,128
Specialty Oxfords and Pumps	369
	211,966

Note—The above figures cover four completed questionnaires from companies, each of which operates several stores in different states. These stocks were not included in the summary table of dealers' stock above.

TOTAL REPORTED STOCKS, SHOWING AVERAGE PAIRS PER DEALER

Cost Price per Pair to Dealer	Dealer Reporting	No. of Pairs	Ave. per Dealers Pairs	P. C. of Total Dealers	P. C. of Total Stocks
Up to 75c	15,490	948,708	61.2	73.9	35.7
76c to $1.00	15,900	652,992	41.1	75.9	24.5
$1.01 to $1.50	14,483	604,050	41.7	69.1	22.7
Above $1.50	9,867	357,544	36.2	47.1	13.4
Specialty Oxfords and Pumps	2,419	98,603	40.8	11.5	3.7
Total	20,948	2,661,897	127.1	100.0	100.0

PERCENTAGE OF DEALERS REPORTING EACH CLASS OF SHOES, BY REGIONS

	Cost Price per Pair to Dealer Up to $0.75	$0.76 to $1.00	$1.01 to $1.50	Above $1.50	Specialty Oxfords and Pumps	Total
New England	70.2	77.3	82.0	63.8	17.7	100.0
Middle Atlantic	75.8	77.3	75.7	52.6	15.2	100.0
E. No. Central	73.6	78.1	74.1	54.4	10.2	100.0
W. No. Central	71.5	79.5	74.4	53.8	12.2	100.0
South Atlantic	76.9	70.1	54.9	29.6	9.4	100.0
E. So. Central	77.1	68.2	50.7	26.1	8.1	100.0
W. So. Central	79.3	73.6	54.2	22.7	9.4	100.0
Mountain	63.4	76.1	68.9	54.7	11.1	100.0
Pacific	71.0	78.1	79.1	60.6	11.8	100.0
Total U. S.	73.9	75.9	69.1	47.1	11.5	100.0

It may be observed that the number of pairs reported in stock becomes progressively less as the cost per pair increases, 35.7 per cent of the total stocks costing up to $0.75 per pair, and only 13.4 per cent of the total consisting of canvas rubber-soled shoes costing over $1.50 per pair.

On the other hand, more dealers reported stocks on hand costing $0.76 to $1.00 per pair than reported stocks costing up to $0.75, although the number of pairs per dealer was less in the case of the higher priced line.

A rough indication of the varying market demand for canvas rubber-soled shoes in different parts of the country is given by showing the percentage of dealers reporting stocks of each class for each region, using the geographical divisions recognized by the Bureau of the Census. For example, taking the number of reporting dealers in New England as 100 per cent, it appears that 17.7 per cent of these dealers handle specialty oxfords and pumps, 82 per cent handle canvas rubber-soled shoes costing $1.01 to $1.50 per pair, and 63.8 per cent handle shoes costing over $1.50 per pair, the highest percentage of dealers with stocks of these items in any region.

A separate tabulation was made of those firms whose stocks of tennis shoes amounted to more than 500 pairs each. There were 487 dealers in this group and their average stock per dealer amounted to 1,524 pairs. The average stock per dealer for the balance of 20,461 dealers was only 94 pairs.

The number of names on the mailing list used for this survey was 129,000. In addition to the 20,952 reports received from firms reporting stocks on hand, 2,490 envelopes were marked "Undeliverable" by the postal authorities, 1,478 responses stated that firms addressed were no longer in business, and 6,013 reports came from firms stating they do not sell rubber footwear of any kind. Furthermore, 2,354 returns were made by dealers marked "no stocks on hand at present" although (presumably) these firms handle tennis shoes, and 404 firms reported that they handle other kinds of rubber footwear than tennis shoes, while 1,160 other firms stated that they do not handle tennis shoes but did not indicate whether or not they handle other rubber footwear. The total number of responses was 34,851.

Statisticians may be able to use these data in estimating the total number of active dealers. From the above, it appears that numerous dealers had completely sold out their stocks of tennis shoes before November 1, and that consequently the average stock per active dealer is less than shown by considering only the reports received from dealers holding stocks.

The Aging of Vulcanized Rubber under Varying Elongation[1]

By A. A. Somerville, J. M. Ball, and W. H. Cope
R. T. Vanderbilt Co., New York, N. Y.

IT is well known that a piece of rubber tubing cracks at that point where it is stretched over a metal nipple, or a piece of water hose cracks where it is stretched over a nozzle. Figure 1 illustrates the cracking of natural-aged rubber goods at those parts which are under some degree of tension or strain. Inasmuch as rubber does crack or deteriorate faster when stretched, experimental work was contemplated to determine the relative degree or rate of deterioration at different percentages of stretch or elongation.

Experimental Method

Circular test rings were cut from flat sheets of cured rubber, then stretched and held at different elongations on a stepped steel cone. (Figure 2). The sizes of the steps on this cone are such that the test rings are stretched from 0 to 100 per cent. Straight mandrels of varying size were also used in addition to this stepped cone. Aging of the rings on the stepped cone or on the mandrels was then done under four conditions:

(1) In the Geer oven where the principal factor concerned is heat;
(2) in the Bierer-Davis bomb where the chief factor is oxygen;
(3) in an electric spark chamber where the principal factor is ozone; and
(4) in the great outdoors where the chief factor is sunlight.

It should be definitely understood that this experimental work concerns itself only with static aging, not with dynamic aging where the test strip is being twisted, flexed, bent, or stretched repeatedly during the aging process. That problem of dynamic aging is entirely different from the present problem of static aging at different elongations, particularly when waxy materials are used in the compound to form a protective film.

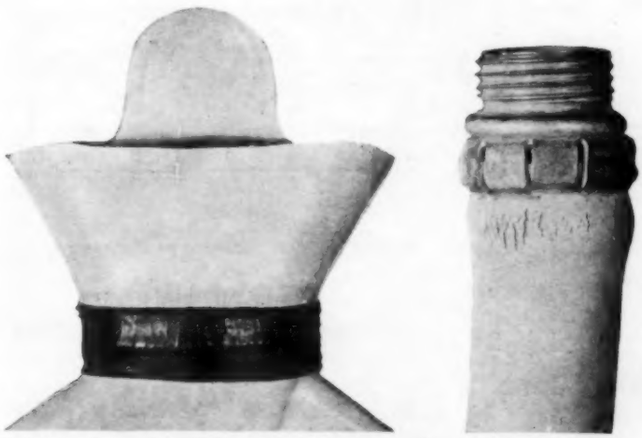


Figure 1—Natural-Aged Rubber Cracked at Parts Under Tension

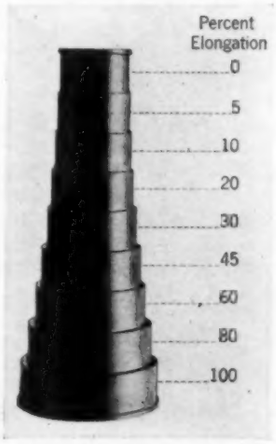


Figure 2—Stepped Cone

A total of sixty-six compounds or recipes was used. These compounds were first cured in sheet form in molds, a range of cures was made at one temperature, tensiles were determined on dumbbell test strips, and what was deemed to be the proper cure or cures was determined from the tensile-time curve. (Figure 3.) This curve

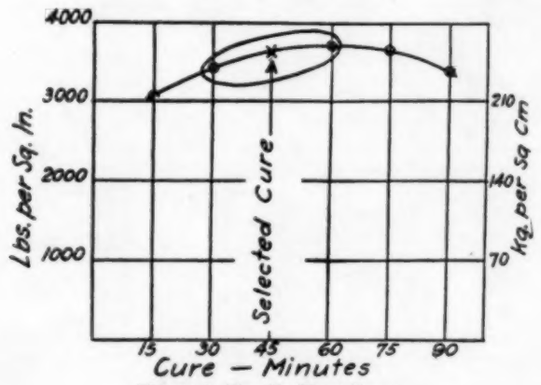


Figure 3—Tensile-Time Curve

has been shown before, and simply represents tensile strength plotted against time of cure. From it the point or points which are considered the proper cures are chosen.

Factors Studied

The variation in the rate and degree of deterioration with respect to varying elongation was then studied as affected by the factors shown in the box on the next page:

[1]Presented before the meeting of the Division of Rubber Chemistry of the American Chemical Society, Atlantic City, N. J., September 26, 1929. Reprinted, with permission, from *Industrial and Engineering Chemistry*, December, 1929.

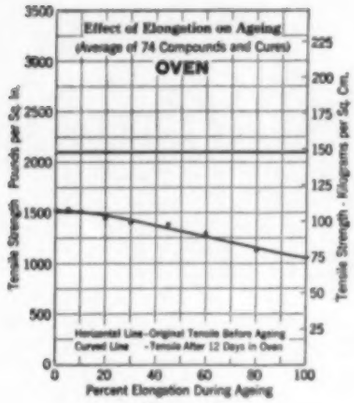

Effect of Elongation on Ageing
(Average of 74 Compounds and Cures)
OVEN
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Line - Original Tensile Before Ageing
Curved Line - Tensile After 12 Days in Oven
Percent Elongation During Ageing

Figure 4

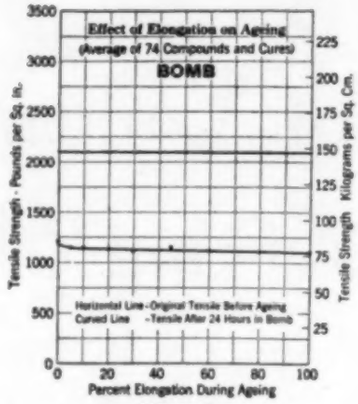

Effect of Elongation on Ageing
(Average of 74 Compounds and Cures)
BOMB
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Line - Original Tensile Before Ageing
Curved Line - Tensile After 24 Hours in Bomb
Percent Elongation During Ageing

Figure 5

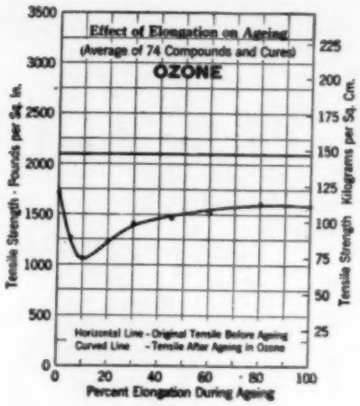

Effect of Elongation on Ageing
(Average of 74 Compounds and Cures)
OZONE
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Line - Original Tensile Before Ageing
Curved Line - Tensile After Ageing in Ozone
Percent Elongation During Ageing

Figure 6

FACTORS STUDIED

(1) Fillers;	**(8) Softeners and waxes;**
(2) Volume loadings;	**(9) Vulcanizing agents;**
(3) Accelerators;	**(10) Percentages of vulcanizing agents;**
(4) Percentages of accelerators;	**(11) Rubbers, including synthetic;**
(5) Percentages of sulfur;	**(12) Times of cure;**
(6) Antioxidants;	**(13) Periods of bomb aging.**
(7) Percentages of anti-oxidants;	

The formula for the basic control compound used for the greater amount of the work was made about as simple as possible, and is given below:

	Parts
Rubber	100
Zinc Oxide	5
Gilders Whiting	60
Stearic Acid	1
Sulfur	4
Diphenylguanidine	1.25

Cure: 10, 15, 30, 45, 60 minutes at 2.8 kg. per sq. cm. (40 lbs. per sq. in.)

In addition to the above, aging tests were made on rubber bands at different elongations from 0 to 700 per cent. These bands were pure gum with 5 or 6 per cent sulfur plus antioxidant.

Results

Figure 4 shows an average or composite curve of all these sixty-six compounds aged for one period of time (12 days) at nine different elongations in an oven. Each point on this curve, for instance at 100 per cent elongation, consists of an average of the tensiles of sixty-six different compounds; all of these compounds aged for 12 days in the oven at 100 per cent elongation, then broken, tensile strengths determined, and the average taken for that point, and similarly for all the other points. This composite curve shows that in oven aging deterioration is approximately 30 per cent greater when the sample is stretched 100 per cent than when it is stretched 0 per cent. Figure 5 shows an analogous composite curve for the same sixty-six compounds aged under similar conditions of stretch one period of time (24 hours) in the bomb. This curve indicates that aging in the bomb is almost independent of the amount the sample is stretched. Figure 6 shows the composite or average curve for the same sixty-six compounds aged one period of time (45 minutes, concentration unknown) in ozone. The ozone chamber or closet contains several pairs of metal plates at a difference of potential of 20,000 volts. The rubber test rings are placed about these plates and the ozone is distributed by means of an electric fan. It will be noted that this curve is not a straight line, but has a dip in it. Figure 7 shows a composite curve for the same sixty-six compounds aged in sunlight one period of time (17 days) the latter part of August and the first few days of September, and there was real

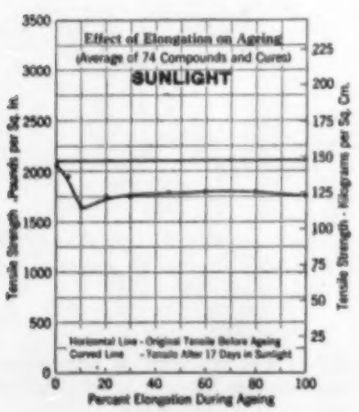

Effect of Elongation on Ageing
(Average of 74 Compounds and Cures)
SUNLIGHT
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Line - Original Tensile Before Ageing
Curved Line - Tensile After 17 Days in Sunlight
Percent Elongation During Ageing

Figure 7

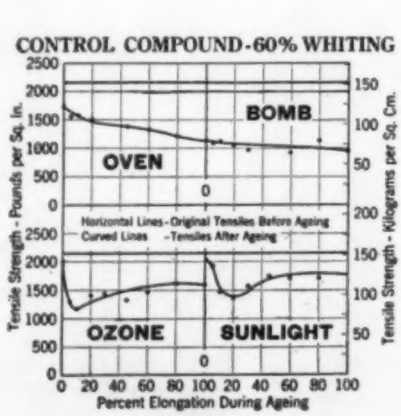

CONTROL COMPOUND - 60% WHITING
BOMB
OVEN
OZONE
SUNLIGHT
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing
Percent Elongation During Ageing

Figure 8

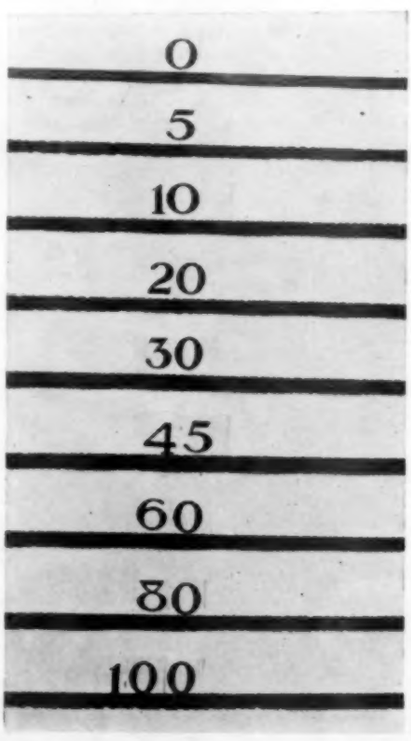


Figure 9—Test Rings of Compound Aged at Different Elongations on Stepped Cone in Ozone.

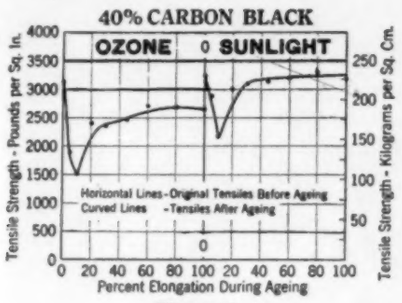

40% CARBON BLACK
OZONE
SUNLIGHT
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing
Percent Elongation During Ageing

Figure 10

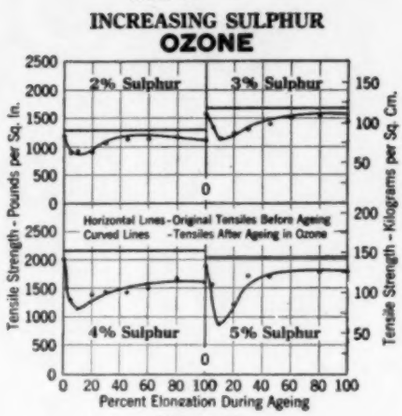

INCREASING SULPHUR
OZONE
2% Sulphur
3% Sulphur
4% Sulphur
5% Sulphur
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing in Ozone
Percent Elongation During Ageing

Figure 11

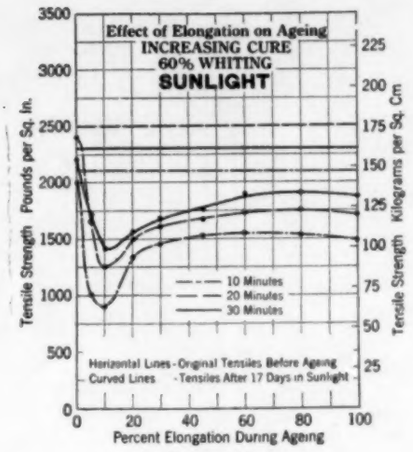

Effect of Elongation on Ageing
INCREASING CURE
60% WHITING
SUNLIGHT
10 Minutes
20 Minutes
30 Minutes
Tensile Strength Pounds per Sq. In.
Tensile Strength Kilograms per Sq. Cm
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After 17 Days in Sunlight
Percent Elongation During Ageing

Figure 12

sunlight all that period. Here again there is a dip in that curve.

From these curves it can be concluded that it is not heat and it is not oxygen that causes rubber to crack at a point where it is stretched; it is ozone or something comparable to ozone in sunlight, and there is a critical percentage of stretch or elongation where that deterioration is greatest

Figure 8 shows curves on the control stock containing whiting, aged at different elongations in oven, bomb, ozone and sunlight.

Test rings crack when aged under tension in ozone or sunlight. Figure 9 shows the test rings of one compound that have been aged at the different elongations on the stepped cone in ozone. In order to photograph these rings they have been taken off the stepped cone and stretched 100 per cent.

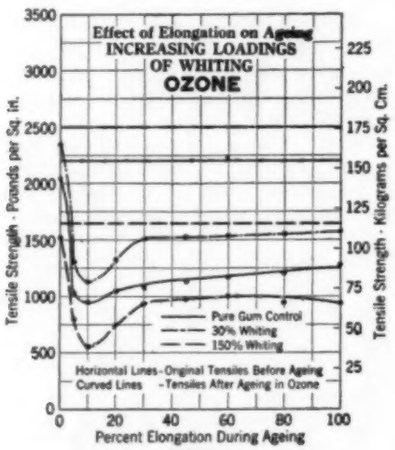

Effect of Elongation on Ageing
INCREASING LOADINGS
OF WHITING
OZONE
Pure Gum Control
30% Whiting
150% Whiting
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing in Ozone
Percent Elongation During Ageing

Figure 13

Figure 10 shows the aging curves in ozone and sunlight of a 40 per cent carbon-black stock—that is, 40 parts of carbon black on 100 parts of rubber, which is equivalent in volume to 60 parts of whiting. Tire manufacturers say that the percentage of stretch in the side wall of a tire when it is inflated on a rim is from 6 to 12 per cent. It seems unfortunate that the critical point of this deterioration curve should come at about 10 per cent elongation.

As the sulfur is varied 2, 3, 4, and 5 per cent on the rubber, and the stocks are aged at different elongations, it appears that the deterioration increases as the sulfur is increased in either ozone or sunlight. (Figure 11.)

As the cure varies 10, 20, and 30 minutes, it appears that the undercures deteriorate faster than the proper cure when aged in ozone or sunlight. (Figure 12.)

As the loading of filler is varied 30, 60, 90, 120 and 150 parts of whiting on 100 parts of rubber, the percentage of deterioration at different elongations is not changed, and the dip in the curve when aging is done in ozone does not move along the horizontal axis. Figure 13 shows the aging of two of these different loadings in ozone as compared with the pure gum control containing no whiting.

The writers had ideas about correlating aging at various elongations with stress-strain data at very low elongations, and to this end have devised means for accurately determining stress-strains at low elongations—i.e., by molding a test ring or loop 25.4 cm. (10 inches) in length so that 25.4 cm. stretch on the testing machine is only 100 per cent elongation. The test ring or loop is of such cross section as to require a considerable pull to stretch it 100 per cent, and accordingly an accurate stress-strain curve can be drawn. That, however, is another matter and has not as yet been tied up with the aging data at different elongations.

Figure 14 shows the aging curves for so-called pure-gum rubber bands aged in oxygen and ozone while they were stretched 0 to 700 per cent. That ozone curve has been duplicated and can be duplicated readily.

From the great amount of data obtained in this work, the results with certain vulcanizing agents show rather low percentages of deterioration during aging, and fairly flat aging curves in ozone and sunlight. Figure 15 shows the aging in ozone and sunlight of a compound cured with 3 per cent tetramethylthiuram disulfide as a vulcanizing agent without any added sulfur.

From the results on the series of compounds containing added softeners two sets of curves are shown—one for mineral rubber (Figure 16) and the other for paraffin (Figure 17). Although the two curves in Figure 16 are of about the same shape, the percentage deterioration is less if anything with the larger amount of mineral rubber, except at the critical elongation of about 10 per cent.

Paraffin is an interesting example of a material that causes bad deterioration in ozone but provides some protection in sunlight, and furthermore the sunlight curve does not have the characteristic dip at 10 per cent elongation. Possibly this might be explained by

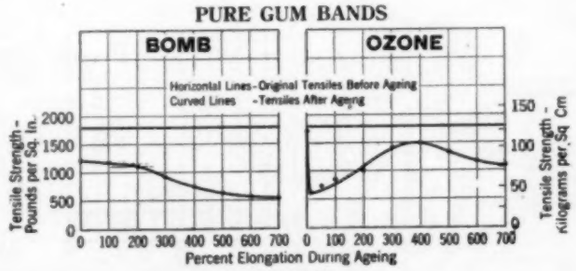

PURE GUM BANDS
BOMB
OZONE
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Percent Elongation During Ageing

Figure 14

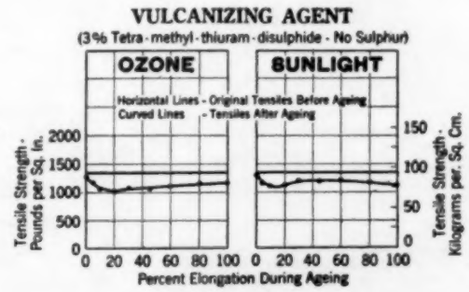

VULCANIZING AGENT
(3% Tetra-methyl-thiuram-disulphide - No Sulphur)
OZONE
SUNLIGHT
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per. Sq. Cm.
Percent Elongation During Ageing

Figure 15

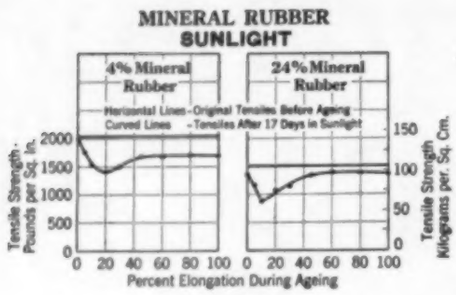

MINERAL RUBBER
SUNLIGHT
4% Mineral Rubber
24% Mineral Rubber
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After 17 Days in Sunlight
Tensile Strength - Pounds per Sq. In.
Tensile Strength Kilograms per Sq. Cm.
Percent Elongation During Ageing

Figure 16

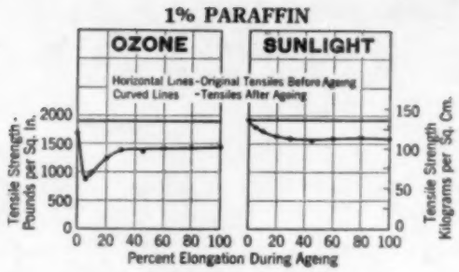

1% PARAFFIN
OZONE
SUNLIGHT
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After Ageing
Tensile Strength - Pounds per Sq. In.
Tensile Strength Kilograms per Sq. Cm.
Percent Elongation During Ageing

Figure 17

the protective film of paraffin breaking under stretch, but uniting again during the period of sunlight aging when the weather was fairly hot.

The addition of an antioxidant does not change the shape of the sunlight or ozone aging curve—that is, it does not take that dip out

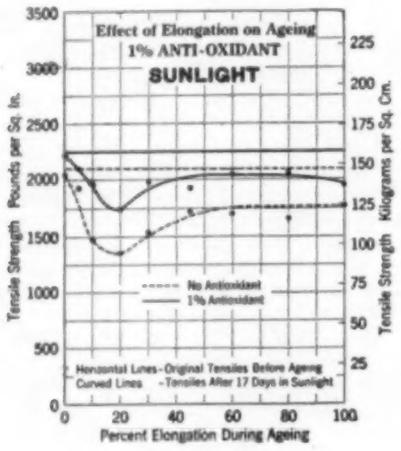

Effect of Elongation on Ageing
1% ANTI-OXIDANT
SUNLIGHT
No Antioxidant
1% Antioxidant
Horizontal Lines - Original Tensiles Before Ageing
Curved Lines - Tensiles After 17 Days in Sunlight
Tensile Strength Pounds per Sq. In.
Tensile Strength Kilograms per Sq. Cm.
Percent Elongation During Ageing

Figure 18

of the curve at the 10 per cent elongation—but it may lesson the degree of deterioration. (Figure 18.)

According to these four different methods of aging—heat, oxygen, ozone, and sunlight—different antioxidants do not always give comparable results. For instance, two antioxidants when tested in the oven and the bomb may have a strictly comparable efficiency, as shown in Figure 19, whereas when tested in ozone and sunlight may have an entirely different efficiency as shown in Figure 20.

Figure 21 shows the aging in ozone of a compound containing synthetic rubber. The tensiles are low inasmuch as the rubber had been lying in the laboratory nearly a year and had begun to oxidize, but the dip in the curve at 5 or 10 per cent elongation is still there.

Summary of Results

1—Deterioration in the oven is approximately 30 per cent greater at 100 per cent elongation than at 0 per cent elongation.

2—Deterioration in the bomb is almost independent of elongation.

3—Deterioration in ozone is greatest at 5 and 10 per cent elongations.

4—Deterioration in sunlight with respect to stretch is analogous to deterioration in ozone.

5—Cracking of the test rings occurs in both ozone and sunlight when the rings are stretched, but not in the oven or bomb. This cracking is greatest at 5 and 10 per cent elongations.

6—A 40 per cent carbon-black stock shows marked deterioration and cracking in both ozone and sunlight at about 10 per cent elongation.

7—High sulfur causes greater deterioration in ozone and sunlight than low sulfur.

8—Undercures show greater deterioration than the optimum cure in ozone and sunlight.

9—Loading with a filler such as whiting does not change the shape of the ozone and sunlight-aging curves, and does not materially affect the percentage deterioration.

10—Rubber bands show progressively poorer aging in the bomb as the stretch increases from 0 to 700 per cent, while in ozone they give an aging curve having the characteristic dip at about 10 per cent elongation, showing the least deterioration at about 400 per cent elongation.

11—Tetramethylthiuram disulfide (3 per cent) as a vulcanizing agent causes rather low percentages of deterioration in ozone and sunlight, and gives fairly flat aging curves.

12—Mineral rubber (24 per cent) causes a smaller percentage deterioration than 4 per cent except at the critical elongation of about 10 per cent.

13—Paraffin (1 per cent) causes pretty bad deterioration in ozone but provides some protection in sunlight.

14—Added antioxidant does not change the shape of the ozone or sunlight-aging curves but may lessen the amount of deterioration.

15—Two antioxidants may give comparable results in both oven and bomb, but quite different results in ozone and sunlight.

16—Synthetic rubber gives a characteristic ozone-aging curve.

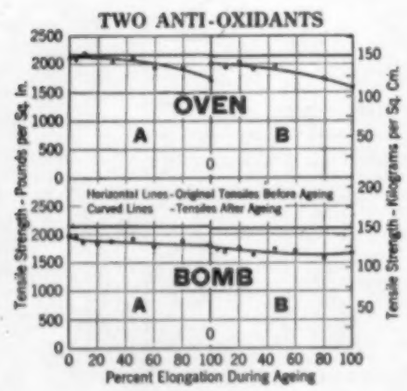


Figure 19

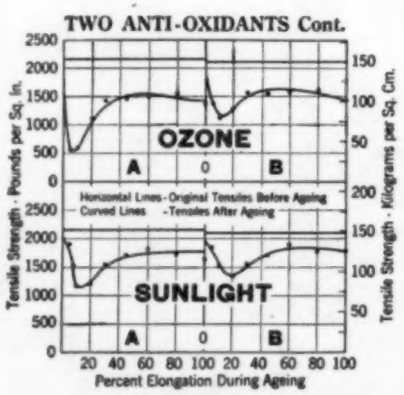


Figure 20

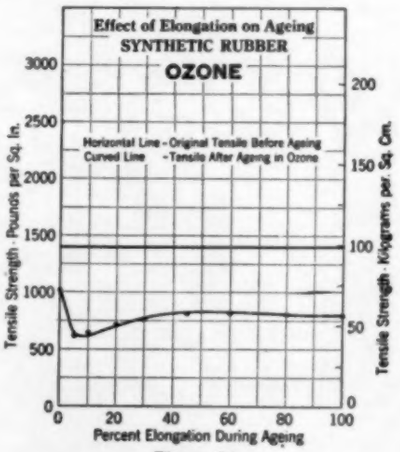

Effect of Elongation on Ageing
SYNTHETIC RUBBER
OZONE
Horizontal Line - Original Tensile Before Ageing
Curved Line - Tensile After Ageing in Ozone
Tensile Strength - Pounds per Sq. In.
Tensile Strength - Kilograms per Sq. Cm.
Percent Elongation During Ageing

Figure 21

Explaining the Use of Tools to a Student Apprentice at the Repair School

Apprenticeship *in the* Rubber Industry*

By C. C. SLUSSER

Vice-President and Factory Manager, Goodyear Tire & Rubber Co.

AT PRESENT many companies and civic groups are training apprentices in the skilled trades. Some have a plan for handling apprentice engineers, and undoubtedly schools which have cooperative courses in commerce and engineering may say that they have apprentices in these lines, though the ordinary meaning is applied to those who are indentured. The term really means a learner or a beginner who is pursuing a course of work and study. It is applicable to those who are familiarizing themselves with the fundamental processes and operations of an industry.

The Goodyear Tire and Rubber Company has adopted the policy of training all-around workers in both production and engineering lines, and of developing and promoting those who prove themselves worthy, because it believes that the future leaders must come from within its own organization. The more capable men it has, from the president of the company down through the ranks, the better will be its position in times of stress, for a company's product is no better than the ideals of those in control.

Training and developing of men as a definite policy dates back to 1913, when Mr. Litchfield, the present president, then factory manager, started what is known as the production squadron. Shortly afterward the engineering squadron was organized. In 1922 the Goodyear Industrial University training course was begun, and in 1925 the apprentice machinists' course was reorganized. All of these programs require three years of hard work and study.

Method of Selection

All of the men and boys on this training work are selected carefully by intelligence test, personal interview, and physical examination. There are no definite educational requirements for the squadron in the case of excellent appearing material.

Personal interview is the first step by which the interviewer sizes up the applicant as to his fitness for the work, attitude, and experience. In any training program three factors are paramount: first, to obtain by careful selection, and thus get as desirable material as possible; second, to train according to the needs of the industry; and third, to retain by having a place for those worthy.

All who are on the different training courses are required to attend, for three hours per week, gymnasium classes supervised by the company's physical director.

The Production Squadron

The production squadron was formed originally for the purpose of having a mobile group of production men who could be sent to departments where extra help was needed, thus preventing a tie-up of the whole organization which might result from the modern method of maintaining a small reserve of material between departments.

The men on the squadron have an allotted time on each of the major operations in order that they may become familiar with the different processes. The benefits the men receive for engaging in this training work are: first, variety of work; second, opportunity to learn the business as a whole; third, contacts with different foremen, providing a better chance to sell themselves; fourth, educational privileges, as each squadron man attends school three hours per week; fifth, guidance and counsel in improving himself; sixth, a pay which compares favorably with the average factory man.

The squadron man has a minimum rate which he can increase by either a merit rate of 2½ cents to 5 cents an hour according to how well he does his work both in school and in the factory, or by ability to earn more than his rate when on piecework. In addition he receives his hourly rate for the time spent in school and gymnasium. The squadron man is required to attend Goodyear Industrial University during his course and pursue the following:

First Year	Rubber Manufacturing Practice Goodyear Organization and Management Economics
Second Year	Rubber Manufacturing Practice Business Correspondence Effective Speaking
Third Year	Sales Foremanship Business Arithmetic Business Law

The men are required to make passing grades in their school

**Presented at the Akron Meeting, 7th American Society of Mechanical Engineers, Akron, Ohio, October 21 to 23, 1929.*

C. C. SLUSSER, Vice President, Goodyear Tire & Rubber Company, who has been Largely Responsible for the Establishment of the Company's Apprentice Training System

work, and the marks they earn, grouped with their gymnasium attendance and the grade cards which they receive each day on their work in the factory, form a merit rating which affects their pay. The second purpose of the squadron is to find and develop men who will fit into the organization and become leaders. Men are taken on for their potentialities and latent business ability as well as for their value in balancing production. During the last three years three complete organizations have been sent to new plants, yet the Akron plant maintained a higher production and plant efficiency than ever before. The squadron made this possible. Facts like this justify the company's present method of keeping in training approximately 350 men.

The Engineering Squadron

The engineering squadron has similar purposes. It makes the engineering departments flexible by furnishing experienced men to all departments when needed, trains men to be efficient, prepares them to be foremen, inspectors, or staff assistants on positions where a thorough mechanical knowledge is required. In other words, it is training men to become leaders in the engineering departments. The engineering-squadron men attend school and gymnasium just the same as the production-squadron men, though their course is along engineering lines. They are given mathematics, physics, mechanical drawing, machine movements, and English as their subjects. Approximately 62 men are following this training program.

Goodyear Industrial University Training Group

The Goodyear Industrial University training group was formed for the purpose of giving instruction to a limited number of high-school graduates who wished to enter staff work, but who require some additional training. These young men work one-half of the time, the major portion of this being in the factory under the direction of the squadron foreman, who sends them through a schedule covering each of the principal operations. Here they learn: first, manufacturing processes; second, the organization and plant; third, production procedure; and fourth, the industrial attitude. The remaining portion of their time at work is in the offices in which they have assignments to acquaint them with the functions of the different departments, and to afford a trying-out period before placement. They attend school the remaining half of their time pursuing such studies as rubber-manufacturing practice, organization and management, sales, typing, shorthand, and office practice. This has worked out very well as these young men not only get the training needed but are familiarized with the company's policies and traditions. This group is never made up of more than sixteen boys. They pay an average tuition of $100 a year, and receive pay for their factory work.

Apprentice Machinists' Course

It is the purpose of this course to produce technically trained skilled mechanics by teaching them the fundamentals and principles of the machinists' trade as it is applicable at Goodyear Tire and Rubber Company. Apprentices spend one-third of their time in school and two-thirds in the shop. They receive no pay for the time spent in school. Two weeks of school alternate with four weeks of work, but the grades made in school have a direct bearing upon the increases in pay.

How Handled in the Shop

A separate room is fitted up with modern machinery, which is in reality a small machine shop by itself. The boys are under a department foreman and instructor who direct and instruct them in the proper procedure of learning the fundamentals of the trade.

All work is production work, either for the regular machine shop or for the machine-design division, and has a standard time set on each job so the apprentice is doing real work and has a definite goal to attain. For this work the apprentice school receives credit from the department for which the work is done, so it is practically self-supporting. In addition to working in the apprentice room, they have assignments such as tool grinding, work at a boring mill, turret lathe, or in the repair gang, work in machine design, the blacksmith shop, etc. Daily records are kept of each boy's production, and the time on each machine is recorded so he can see what progress he has made on his course.

The apprentice is not made a specialist in any one line, but is given the fundamentals and practical application in all of the different operations, and upon the different machines that are essential. The time for each machine or assignment is approximately as follows:

Class of Work	Weeks
Lathe	12
Milling machine—vertical and horizontal	16
Drill press	4
Bench work and floor work	12
Tool grinding	4
Boring mill	8
Vertical turret lathe	4
Machine design	10
Repair gang	4
Planer and shaper	9
Tool room	3
Bolt cutter	3
Screw machine	3
Blacksmith shop	4
Vacations and extra work	8
Total	104

In addition to the apprentice machinists, there are a few on pattern making. These boys follow the same plan as the others except that the shop instruction is given them by the foreman of the pattern shop. Each boy is taught to perform the various operations in building patterns for the machinery used in the plant. One-third of the time is devoted to studies which are related to the work. As these young men are entering the machinists' trade, which is a branch of engineering, the major portion of their work is technical, and provides adequate instruction, so if any show the required qualities of leadership, their future will not be impaired due to lack of proper foundation.

Course of Study

First Year	Shop arithmetic, ½ yr. Technical algebra, ½ yr. Physics English Metallurgy Mechanical drawing and sketching
Second Year	Technical algebra, ½ yr. Trigonometry, ½ yr. Physics Effective speaking Machine-shop practice Mechanical drawing and sketching
Third Year	Trigonometry and review Physics American government Economics Mechanical drawing

All classes are held in Goodyear Industrial University, where instruction is given by full-time instructors the year around. Apprentices receive during their three-year course about fifty weeks of classroom work. Four groups totaling 47 are now in the apprentice school.

Merit System of Pay. In the plan used with the Goodyear

industrial-training group, the student is rated daily in the factory on his production, and this is totaled up each month as compared to the following maximums:

80 per cent base rate or better	25
Perfect school standing	40
Perfect attendance at factory	5
Perfect attendance at gymnasium	5
Foreman's opinion	25
	100

A total of less than 80 on this scale earns no merit rate; a total of 80 and less than 85 earns 2½ cents per hour merit rate; a total of 85 or better earns 5 cents per hour increase. This merit increase

Student Apprentices in the Goodyear Tire Repair School

is in addition to the periodic raises in rate of pay, but is effective for only the following month, so it must be earned continually or the hourly rate will drop back to the standard rate.

Machinist School. In the apprentice school different factors and equated values are used with the maximum shop values as follows:

Productive ability as compared with standard time	28
Workmanship	28
Conduct	7
Attendance	7
Foreman's opinion	30
	100

The "production" grade is posted daily on a blackboard in the apprentice shop. At the end of a six-weeks' period, 66 2/3 per cent of the total shop grade is added to 33 1/3 per cent of the average grade in the school work. A total of 80 points is equivalent to the regular rate of pay. Each two points above this determines a 1 cent increase in pay. Periodic raises are not given to the apprentices as some will earn increases sooner than others.

Cost of Operation. It has been found that the apprentice system as operated is financially sound. The following are the figures for three years of operation. They include total expense of shop gymnasium, and school, but excluding overhead:

	1927	1928	1929 to Aug. 1
	$49,553.36	$62,695.39	$40,686.27
Total recovery	47,992.56	65,832.27	43,766.34
Loss	1,550.80	.....	.....
Profit	.....	3,136.88	3,078.07

The item marked recovery is the value of the labor performed by the apprentice on actual production material charged off at the average shop rate.

Results. In addition to the foregoing figures there are other intangible results that would still make the apprentice system worth while even if the method in use did not show a profit. The one group that has graduated has been eagerly absorbed by the organization. In fact there was keen competition between several of the departments in regard to which one should be entitled to receive the larger number. This readiness to accept the graduates showed a demand that caused the company to enlarge its plans so that more groups were enrolled than were at first contemplated.

This demand can be well understood by any one who has in the past few years searched the employment bureaus for machinists. Such a manager can fully appreciate the feeling of satisfaction that the plant management enjoys when he sees the groups of alert, physically and mentally well-trained apprentices getting ready to assume positions of responsibility.

The apprentices have a club to which each one contributes monthly dues, to defray expenses of a formal banquet and stag dinner. They arrange numerous outings for themselves. Athletics also plays an important part during the year. In training apprentices it is the duty of those in charge of the work to teach them not only the fundamentals of the trade, but the value of living clean, moral lives and becoming thrifty, useful citizens.

America's Share in the Hard Rubber Trade

UNITED STATES exports of hard-rubber goods during the past five years have averaged a value of $769,600, according to the Department of Commerce. The peak of the trade was reached in 1925, when exports were valued at $953,350; since then the value has fallen below $700,000, but with promises for a substantial increase in 1929. Exports for the first six months of 1929 register a value of $402,630, or 58 per cent of the total exports for the entire year 1928. The radio industry, particularly, has added an impetus to the hard-rubber goods trade.

The value of domestic production of hard-rubber goods in 1927 amounted to $18,590,686—a decrease of 36 per cent from the previous census of 1925. About 38 establishments manufacture hard-rubber goods, Ohio leading with 13 factories and the remaining 25 being divided among 11 States.

The local production of hard-rubber goods closely approximates the domestic consumption, inasmuch as the United States exports only about 4 per cent of the total output. Imports are small with the exception of hard-rubber combs, which amounted in 1928 to a value of $600,687, the greater portion of which was supplied by Germany. The value of imports for the first six months of 1929 equaled $491,335.

The export trade of the United States for recent years in hard-rubber articles follows:

Principal Markets for American Hard-Rubber Goods

Country of destination	1925	1926	1927	1928
Canada	$331,028	$221,370	$259,186	$234,108
United Kingdom	299,920	172,777	160,934	121,940
Australia	60,006	70,375	58,824	64,229
Japan	26,330	27,501	36,907	53,941
Argentina	11,106	21,909	21,061	27,604
France	105,354	40,898	19,865	44,721
Mexico	23,591	14,024	12,649	11,907
Other countries	96,013	113,021	127,721	137,701
Total	$953,348	$681,875	$697,147	$696,151

Sunchecking of Rubber

THE Bureau of Standards has recently completed a test on commercial materials designed to prevent, or at least retard, the cracking and checking of rubber compounds exposed to sunlight. The commercial names of the materials examined were not made public. Samples of rubber tubing were made containing the antichecking materials as well as with some containing a wax commonly used for this purpose.

With the tubing under a slight tension, checking was apparent on plain samples within 15 days, while those containing "anticheckers" or large amounts of wax showed none for a least 90 days. Waxes in the amounts necessary to prevent sunchecking have a tendency to "bloom" to the surface—a feature which is objectionable on some rubber articles. Although no particular investigation has been made of the "blooming" characteristics of commercial anti-checking materials, our tests indicate that they might be used in many places where the surface bloom of wax would be objectionable.

Chicago Rubber Group, A. C. S. Discuss Factory Problems

Holds Its Second Meeting Since Organizing—Three Papers Are Read—C. E. Frick Presides As Chairman

THE recently former Chicago Group of the Rubber Division of the American Chemical Society, at its second meeting on October 25th, held in the City Club of Chicago, reviewed "Factory Control Problems" as its subject for the evening. Three papers were read and discussed. Brief abstracts of these papers are given below. Because of illness in his family, R. E. Cartlidge, chief chemist of the Akron Rubber Reclaiming Company, did not appear but his place was taken by William Welch, vice-president of the same company, and president of the Midwest Rubber Reclaiming Company. Dr. Carl E. Frick, of Van Cleef Brothers, chairman of the Chicago Group, presided at the meeting.

Abstracts of Papers

Factory Problems of Today

RICHARD F. KINSLEY, *Dryden Rubber Company*

Emphasis was laid on the problem of "lower factory cost," which in turn, is directly affected by "problems of personnel," "problems of materials" and "problems of machinery." As appealing to chemists, the "problem of materials" must naturally come first but is also definitely linked up with personnel, for only too often, a good man wrongly placed can become a serious liability to his firm rather than an asset. The "problem of personnel" also involves wage scales and wage systems. Piece work in many factory operations have not only worked toward economy for the company but an increase in the daily return to the worker.

R. F. KINSLEY

The "problem of materials" is also allied to the matter of waste and it evolves upon the chemist to utilize this waste back into products to the best advantage possible. The fluctuations in the price of crude rubber also present a problem and when stocks of crude have been purchased at high prices, the chemist must be prepared to make substitutions in proportion to the fluctuation in price of his raw material. High grade reclaimed will often serve his purposes. The chemist must also watch over the re-compounding of unvulcanized compounds in process. These must be used up promptly so that the inventory of "mixed stocks" on hand will be kept active and low, because a rapid turnover of materials has a decided effect on the lowering of costs. Another associated problem is always the prevention of premature cure in the "mixed stock," which involves, in turn, such problems as the proper selection of accelerators, the proper time and place for the addition of these accelerators, and the proper method of cooling the machinery and stocks after mixing. The "problem of machinery" presents many angles. One of the best instances of machinery in the rubber industry reducing costs is in the case of the internal mixer with which it is now possible to mix a compound at the rate of 400 pounds per minute.

Factory Problems in Tire Manufacturing

H. B. UNDERWOOD, *Ajax Rubber Company*

The first problem comes in the variability of crude rubber. The variation in rates of cure has been somewhat minimized by the "levelling off" effect of modern accelerators but the blending of different lots of rubber as much as possible will further cut down this variation. The use of the William plastometer on each batch of mixed stock will lessen variation in plasticity. Automatic temperature controls will also assist in preventing troubles before the stock is calendered. Tire fabrics should be handled to prevent distortion during calendering. In the handling of processed fabric, running too close to the calender with not enough bank of fabric waiting to be put through the bias cutter often results in some fabric being cut while still warm and some being cut while cold. Carbon blacks have also presented a problem in so far as some of them absorb accelerators to a greater or less degree, thus causing a variation in the rate of cure. One method of avoiding this is by putting the accelerator in last, thus cutting down the time during which the carbon black is in contact with the accelerator at the relatively high temperature of mixing. Two major problems encountered with stocks containing high power accelerators are the scorching or setting up during the milling or calendering, and second, air curing or pile curing occurring in stocks stored in bins or in calendered stocks or fabrics in rolls. Preventive measures covering the first case involve cooling systems sufficiently accurate enough to keep the temperature of the stock during these operations below 210 degrees F.

Confessions of a Rubber Reclaimer

WILLIAM WELCH, *Akron Rubber Reclaiming Company*

The rubber reclaiming industry has not fully kept pace with the rubber industry. Chemical problems in tire manufacture have completely revised themselves since 30 years ago when the first patent was taken out on the alkali process of reclaiming, yet the same process is still in use. But great improvement in machinery and manufacture has materially advanced the quality of reclaim. It is believed, however, that the reclaiming industry can make still greater progress if it can arouse the intelligent interest of the factory men who use reclaim. The use of reclaimed from an economic point of view is an important one. The stabilizing of crude rubber prices has been accomplished largely through the use of reclaimed rubber. The question of how the quality of reclaim can be maintained when the tires which are now being reclaimed already contain a large percentage of reclaim is answered by the statement that the art of reclaiming is capable of such improvement as to permit the taking of scrap rubber of lower rubber content than was true a few years ago and manufacture from that a higher grade of reclaim than has been made in the past. A major problem of the reclaimer today is in devulcanizing and if the reclaiming industry can further solve this problem there need be no fear as to the future quality of reclaim.

In the discussion which followed Mr. Kinsley's paper, the fact was brought out that the Dryden Rubber Company was operating 75 per cent on piece work and that this policy had been in effect for the last ten years. In the discussion on Mr. Underwood's paper, Mr. Urech, of the Inland Rubber Company, stated that his company had made a consideration study on variations and had found that a slight variation in the grade of fabric caused variation at calendering and cutting machines more than those caused by temperature variations and that Fisk and Goodyear are cutting fabric more accurately by means of a machine which eliminates variation in the tension of the filler threads. In connection with a question regarding variations in carbon blacks, Mr. Underwood stated that this seemed more of a question of locality than manufacture and that carbon blacks produced in certain localities work better with D. P. G. than blacks from other districts.

Rubber Industry Sales Higher *Than* Production

Shipments of Rubber Products Increase in Third Quarter, But Consumption of Crude Rubber is Lowest for Current Year

THAT the rubber industry has been successful in its attempt to cut down heavy inventories as the result of record-breaking production in the first half of 1929 is definitely shown in the statistics compiled by the Rubber Manufacturers Association from its quarterly questionnaire for July, August and September. In these three months, the sales value of shipments from rubber factories were the highest in a year, while the amount of crude rubber consumed in production was less than in any similar period since the second quarter of 1928.

The actual value of all shipments of manufactured rubber products during the period totaled $326,292,000, as compared with $312,863,000 in the second quarter of 1929 and with $274,050,000 in the first three months of the year. Tires, tubes, and tire repair materials, as usual, comprised the greater part of the total sales value of all rubber goods. The value of these items alone reached a figure of $222,933,000, as against $103,359,000 for all other rubber products combined. Marked gains were made, however, in the amount and value of other rubber lines, particularly rubber boots and shoes, and the increase in shipments registered by these other rubber products was greater in proportion than that recorded by tires and tire sundries.

In amount of crude rubber used, tires, tubes and tire repair materials absorbed 94,630 long tons out of a total of 113,746 long tons consumed by the entire industry in the third quarter. Rubber consumption in the tire industry showed a sharp decline from its second quarter absorption of 120,726 long tons, but the use of rubber for other products rose to what is believed to have been the highest point in the history of the industry. According to the Association figures, reclaimed rubber consumption in July, August and September was 56,963 long tons and production 58,040 long tons. These figures show only a slight decline from the second quarter report of 62,297 long tons consumed and 62,107 long tons produced.

Combined figures for the first nine months of 1929 show a total value of all rubber goods shipments of $913,178,000, as compared with a total of $926,414,000 during the first three quarters of 1928. Unit prices were lower this year, however, and the actual quantity of goods shipped is believed to have been the greatest in history. In the first nine months of the year, consumption of crude rubber reached the record breaking total of 381,603 long tons, as against only 324,631 in the period from January to September, 1928.

The figures presented in the table below are estimated by the Rubber Manufacturers Association to represent 92 per cent of the American manufacturing industry, but those quoted in this article have been raised so as to represent 100 per cent of the domestic industry.

Comparative Table of Value of Rubber Goods Shipments from Manufacturing Plants and the Amount of Crude Rubber Consumed for the Last Five Quarters

Total Sales Value of Manufactured Rubber Products Shipped
Thousands (,000) omitted

	Product	3Q-29	2Q-29	1Q-29	4Q-28	3Q-28
	Tires and Tire Sundries					
1	Auto and Truck Casings	$169,903	165,571	141,240	128,521	190,986
2	Auto and Truck Tubes	23,604	24,011	20,558	18,480	29,755
3	Motorcycle Casings and Tubes	405	426	318	334	585
4	Bicycle Casings and Tubes	877	785	584	867	813
5	Aeroplane Casings and Tubes	100	144	147	76	118
6	Solid and Cushion Tires	4,752	5,049	4,253	4,862	7,219
7	All other Solid Tires	721	747	577	292	374
8	Tire Sundries and Repair Materials	4,737	4,141	4,376	5,283	5,807
	TOTAL—Tires and Tire Sundries	$205,099	200,874	172,053	158,715	235,657
	Other Rubber Products					
9	Mechanical Rubber Goods	$ 28,234	30,926	28,835	23,629	25,756
10	Boots and Shoes	31,266	22,303	20,986	29,595	26,890
11	Insulated Wire and Insulating Compounds	8,963	7,734	8,199	11,384	7,605
12	Druggist Sundries, Medical and Surgical Rubber Goods	2,409	1,957	2,230	2,133	2,310
13	Stationers' Rubber Goods	631	646	682	645	634
14	Bathing Apparel	503	1,597	653	167	465
15	Rubber Clothing	2,696	1,868	1,362	2,559	2,963
16	Automobile Fabrics	3,267	3,021	2,447	1,629	2,380
17	Other Rubberized Fabrics	2,751	2,099	1,739	3,249	3,544
18	Hard Rubber Goods	1,889	1,640	1,587	2,329	2,157
19	Heels and Soles	6,298	5,895	5,774	5,690	5,657
20	Rubber Flooring	1,366	1,137	892	1,268	1,097
21	Sporting Goods, Toys and Novelties	2,002	2,676	1,578	1,421	1,877
22	Miscellaneous, not included in any of above items	2,815	3,461	3,109	3,076	3,861
	TOTAL—Other Rubber Products	$95,090	86,960	80,073	88,774	87,196
	GRAND TOTAL—All Products	$300,189	287,834	252,126	247,489	322,853

Crude Rubber Consumed—Long Tons

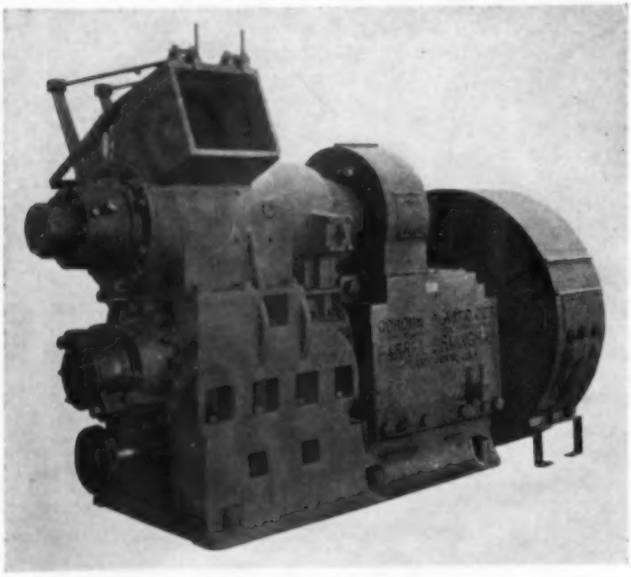
	Product	3Q-29	2Q-29	1Q-29	4Q-28	3Q-28
	Tires and Tire Sundries					
1	Auto and Truck Casings	69,220	89,261	82,393	75,189	72,065
2	Auto and Truck Tubes	13,813	17,038	15,736	12,961	15,426
3	Motorcycle Casings and Tubes	61	87	64	57	117
4	Bicycle Casings and Tubes	349	279	248	228	274
5	Aeroplane Casings and Tubes	66	60	27	21	55
6	Solid and Cushion Tires	2,175	2,733	2,209	2,879	3,488
7	All other Solid Tires	224	293	182	63	67
8	Tire Sundries and Repair Materials	1,152	1,317	1,232	1,574	1,681
	TOTAL—Tires and Tire Sundries	87,060	111,068	102,091	92,972	93,173
	Other Rubber Products					
9	Mechanical Rubber Goods	5,785	6,022	5,783	4,501	4,711
10	Boots and Shoes	4,873	4,740	3,827	4,631	3,906
11	Insulated Wire and Insulating Compounds	976	717	1,071	997	901
12	Druggist Sundries, Medical and Surgical Rubber Goods	545	487	537	472	433
13	Stationers' Rubber Goods	316	375	355	324	285
14	Bathing Apparel	103	223	284	140	64
15	Rubber Clothing	471	369	283	344	361
16	Automobile Fabrics	342	365	318	209	254
17	Other Rubberized Fabrics	709	512	452	777	831
18	Hard Rubber Goods	381	317	339	193	294
19	Heels and Soles	1,635	1,471	1,535	1,299	1,441
20	Rubber Flooring	285	298	257	292	299
21	Sporting Goods, Toys and Novelties	344	430	429	307	330
22	Miscellaneous, not included in any of above Items	821	755	719	731	884
	TOTAL—Other Rubber Products	17,586	17,081	16,189	15,217	14,994
	GRAND TOTAL—All Products	104,646	128,149	118,280	108,189	108,167

New Two Stage Plasticator

THE breaking down of rubber in the large tire plants has become a big factor. Large numbers of mills covering a great deal of floor space, absorbing tremendous power, costing thousands of dollars to install, and many men to operate, are required to carry on production. The advent of a new single purpose machine bids fair to release a great many large mills for purposes other than breaking down.

A new machine just placed upon the market and called a plasticator, accomplishes the breakdown of many tons of rubber in a relatively small space, and with a large saving in horsepower.

The first machine of this type was put into production October 1, 1927. A second followed in January, 1928, and



New Two Stage Plasticator

these two machines have been in productive operation ever since. There were some drawbacks to the first machines. however, which made it advisable to radically change their design. The result is the two stage plasticator illustrated. This machine turns out broken down or masticated rubber at the rate of about 5500 to 6500 pounds per hour, according to the kind of raw material, and to the degree of plasticity desired. Although the first design turned out only about 3800 pounds per hour, with a temperature seldom below 290° F and often higher, the two stage machine has almost doubled that production with a drop in temperature of product to 250° or 260°.

One man can feed two machines, providing the rubber is transported to him at the level of the hoppers; but one man is required at the delivery end of each machine, and unless he has an automatic cutting off machine and other men to provide him with empty racks after removing the filled racks, this one man would be overwhelmed with the machine's production.

The masticated rubber issues from the machine in an endless tube 6" to 7½" in diameter, and from 1" to 1½" thick, according to the material being worked, and also whether this material is going through the machine for the first time, or the second. For some purposes it is desirable to double plasticate the rubber. When this is done, the output of the machine increases from about 6600 pounds to about 8500 pounds per hour. This makes an average of about 3500 pounds per hour. The same figuring for sprayed latex, probably the most difficult rubber to masticate, is 3400 pounds per hour, and a splendid breakdown is acquired at this rate.

About an average of 450 H. P. is necessary to run the machine, peak loads rising to about 500 H. P. on sprayed latex. The load is very steady, and the peaks are not sudden shocks, nor are they very high above the average load line.

In some places it has been found desirable to masticate reclaimed rubber to reduce new and old stock to about the same softness. No figures are available at this time on the production of reclaimed rubber through the two stage machine; but in the early machines the single stage produced from 6000 to 8000 pounds per hour, and it is probable that the two stage machine would deliver a minimum of 8000 pounds and more under certain conditions. A study of the above figures will afford a means of comparison of the cost to any manufacturer of breaking down his rubber by his present methods, or by one of these new plasticators.

The new plasticator is being manufactured by Farrel-Birmingham Company, Inc.

Tests on Rubber Floor Tiles

THE United States Bureau of Standards has recently completed various tests on samples of rubber floor tiles and has published the conclusions in Circular Letter No. 270. About 15 makes of tile, each consisting of one or more different styles and colors were obtained from manufacturers for the purpose of determining the following properties of this type of floor covering:

General characteristics such as appearance, dimensions, uniformity, type of back, hardness, and flexibility.

Resistance to abrasion.

Tendency to become permanently indented such as might be caused by furniture.

Ease of cleaning or, conversely, the tendency to retain a dirty or stained appearance.

Deterioration with age, that is, changes which take place in the appearance and physical properties due to aging and the action of light.

Methods of laying.

An examination of the samples with respect to hardness and flexibility showed that they were far from uniform; for instance, some tiles could be bent double without breaking or cracking while others of the same thickness were so firm and hard they would break if bent around a ¾ inch diameter rod. General observation leads to the conclusion that the firm, relatively hard tiles are superior to the softer ones from the standpoint of staying in place when laid.

The resistance to abrasion or wearing quality will vary with different makes; and tests show that some tiles are two or three times as good as others in this respect.

In locations subject to very heavy traffic, of course, abrasive wear might be a feature of considerable importance. The actual relation between rubber tile and other flooring materials under such conditions naturally depends upon the specific products compared, but generally speaking, the life of rubber tile should be equal to or greater than other types of soft floors.

The action of sunlight on rubber tile is illustrated by the results of tests of 60 samples which were exposed near an east window for six months. An examination at the end of this period showed that every sample had lost its gloss and in most cases the surface had "chalked" as is often observed on painted surfaces exposed to sunlight. In addition, most of the colors had faded to a greater or less degree and in several cases there was surface checking.

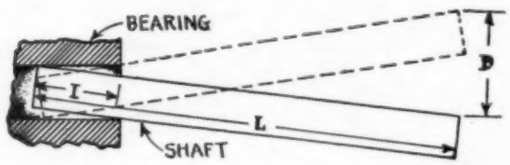
Schaphorst's CHATS *with the* ENGINEER

By W. F. SCHAPHORST, M.E.

What Is the Clearance?

EVERY user of shafting knows that a loose shaft will "wiggle." The looser the shaft the greater the wiggle. In other words, the looser the shaft the greater the so-called "clearance." However, I dare say that very few users of shafts in the rubber industries know that this wiggle characteristic may be utilized for determining the amount of clearance between the shaft and its bearing. And what is more, it eliminates the necessity of a micrometer or fine hair-breadth measurements.

My sketch herewith shows how this is accomplished and it also shows clearly "why" it is possible to measure clearance in this way.



Take the shaft out of the bearing and measure its length L in inches. Then shove it part way back into the bearing, distance I, which might be called the "distance of insertion." Now move the end of the shaft from extreme to extreme the distance D, as shown in the sketch.

It is obvious that the distance D is directly proportional to the clearance. The greater the clearance the greater the distance D. If there is no clearance whatever the end of the shaft cannot be moved. Of course, if it is a long shaft it can be deflected owing to the elasticity of the shaft. This matter of deflection must of course be taken into consideration if the shaft is long. If the shaft is short and large in diameter deflection may be neglected.

After making all of the measurements suggested above and shown on the sketch, multiply the movement distance D by the insertion distance I in inches and divide by twice the length of the shaft L in inches. The result will be the clearance in inches.

For example, if D=¼"; I= 1"; and L=10"; application of the above rule tells us that the clearance between the shaft and bearing is 0.0125". Of course this sketch has been exaggerated purposely to show the principle behind this method of determining clearance.

It is obvious that this method is useful also for determining whether or not a bearing is out of round and if so how much. This is accomplished by measuring the distance D in several directions.

The annual report of the Dominion Bureau of Statistics on the Canadian Rubber industry shows that during 1928 the consumption of crude rubber was 30,049 tons and the consumption of reclaimed rubber 11,808 tons, or 39.3 per cent as much reclaimed as of crude rubber.

REVIEW DESK

Books, New Publications, Catalogues, Etc.

SOUTH AMERICAN MARKETS FOR RUBBER SUNDRIES AND SPECIALTIES. Compiled by the Rubber Division, Department of Commerce. Published by the Government Printing Office, Washington, D. C. 1929. Price, $.10.

South American countries are each year increasing their purchases of United States rubber sundries and specialties. Last year American shipments of these products to South American markets reached a value of nearly $700,000, representing about 12 per cent of our total exports of these commodities. The high lights in connection with marketing soft rubber products in the South American republics are outlined in this bulletin, particularly the competitive conditions, the demand, and methods of doing business.

MODERN BUSINESS AND THE OPEN MIND. By Julius H. Barnes. Published by the Chamber of Commerce of the United States, Washington, D. C. 1929. 24 pp. For free distribution.

The outstanding developments in American industry and their effect upon the general public are traced in this reprint of an address by Mr. Barnes, chairman of the board of directors of the Chamber of Commerce of the United States, before the conference of the national councillors of the National Chamber at Columbus, O., on October 12.

SOME PROPERTIES OF SPONGE RUBBER. Prepared by the Bureau of Standards, Department of Commerce. Published by the Government Printing Office, Washington, D. C. 1929. 12 pp. Price, $.05.

General information on soft sponge rubber as commercially manufactured and certain data on the physical properties of 13 different samples of sheet material are furnished by this paper. The properties investigated included weight per unit volume, hardness, porosity, tensile strength and elongation, permanent "set," buoyancy in water, hysteresis under slow compression, hysteresis under impact, and thermal conductivity.

PUBLIC REGULATION OF COMPETITIVE PRACTICES. Published by the National Industrial Conference Board, Inc., 247 Park Avenue, New York City. 1929. 332 pp. Price, $3.00.

Certain competitive tactics in business have become subject to governmental regulation, and the history of the legislation affecting such practices should be familiar to all executives in industry. This study, a revised second edition of a previous volume under the same title, brings up-to-date the discussion of existing anti-trust policy, the present state of the law, the regulation of price and trade relation policies, resale price maintenance, misbranding, trade mark simulation, interlocking directorates, stock acquisition, etc.

AGRICULTURAL ZOOLOGY OF THE MALAY ARCHIPELAGO: The Animals Injurious and Beneficial to Agriculture, Horticulture and Forestry in the Malay Peninsula, the Dutch East Indies and the Philippines. By K. W. Dammerman. Published by J. H. de Bussy, Ltd., Amsterdam, Holland. 1929. Price, 40s.

While in the main an English edition of the author's previous work on the Dutch East Indies, published ten years ago, this volume has been extended in scope and includes descriptions of the animal pests, soil fauna and plant parasites of all the territories mentioned in the title. The pests and parasites harmful to the *hevea brasiliensis* and *ficus elastica* are described in detail with life-size color plates of the insects.

RUBBER PRODUCING COMPANIES—1929. Published by the Mincing Lane Tea & Rubber Share Brokers' Association, Ltd., 14 Mincing Lane, London, Eng.

As the first edition of this standard guide to be issued after the termination of the Stevenson Act restrictions, this volume is of special interest. The work follows the lines of previous editions, giving exhaustive data relating to over 600 companies. A list of directors and secretaries of rubber plantation companies is also given.

TWO YEARS' EXPERIENCE WITH CERTIFIED CARBON BLACK. By C. R. Johnson. Published by Godfrey L. Cabot, Inc., Boston, Mass. 1929. 28 pp. For free distribution.

Control of the quality of carbon black has been a difficult problem for technical men for many years. Despite the well known fact that there were marked variations in the reinforcing properties of various carbon blacks, these could not be detected by any specifications except an actual test in rubber. The volatile matter test, which has since been devised, is described in this attractive paper and the means by which it permits actual control of variability are outlined in detail. An appendix lists the results of 27 physical tests on good, medium, and poor quality carbon blacks with various accelerators, proving that quality variation in the blacks does effect the rubber test.

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EDITORIAL COMMENT

Stabilizing Prosperity

PRESIDENT HOOVER'S program for the "stabilization of prosperity" cannot fail to affect the rubber industry in a great many ways, and in turn, bring about a certain stabilization within the industry itself. With no decline promised in the automobile manufacturing industry, the market for tires will not diminish; the huge program for building construction, public works and industrial expansion will increase the market for mechanical rubber goods and doubtlessly enlarge the field of application of rubber; the success of the drive against unemployment will put more money in the pocket of the wage-earner for necessary family purchases and more footwear will be bought. The stabilization within the industry itself will come from the knowledge that a steady market awaits the production of each factory, that steady work continues for each wage-earner and that a satisfactory return on investment in the form of profits and dividends is assured.

As a matter of fact the present "crisis" finds the rubber industry in not an unfavorable position. It has enjoyed a fair degree of stability in the prices of its raw materials, and at the moment, there are ample supplies of crude rubber available at the lowest price levels since 1922. The past year has been a record one in the volume of unit sales and while prices have been low and competition keen, particularly in the case of tires, most of the rubber companies are going to show fair profits. Tire inventories at the present time are the lowest since November, 1928, and tube inventories are lowest with one exception since 1925. Shipments during the third quarter of the year exceeded production. With spring-dating schedules under way, production in tires and tubes is already showing an increase over October and November outputs.

With the President's program already well started and with the rubber industry in such a favorable position, it would be difficult indeed to find any basis for skepticism as to the soundness of the industry or pessimism as to the outlook for 1930.

Malayan Production

THE greatest surprise of the year, in crude rubber circles, has been the astounding production figures coming from Malaya, exceeding even the most extravagant estimates of a year ago. In the days of restriction the highest "standard production" figure was 337,000 long tons and even that total was considered far above the possible production capacity of the plantations, and the true figure was thought to be more nearly around 300,000 tons. Suddenly, within a period of scarcely a year, the actual production of Malaya, under free tapping, has jumped to approximately 440,000 tons.

Economists and statisticians in rubber circles have been busier than the proverbial one-armed man with the itch, attempting to account for this extraordinary increase. The existence of unreported or hidden stocks held at the close of restriction has been used as a weak explanation which is far from convincing and it can certainly be assumed that such hidden stocks ceased to be a factor in exports from Malaya since early in the current year. Abnormal productivity of the rubber trees, due to the long period of rest or mild tapping during the restriction years is another theory advanced and is probably the most plausible. Overtapping, improved tapping methods and better labor are still other reasons given. There probably has been considerable overtapping in the native areas and improved tapping methods have unquestionably brought in better yields per acre on the well managed estates.

The question has been given considerable attention by E. G. Holt, chief of the Rubber Division of the Department of Commerce.

"Although it is still too early to decide whether Malayan 1929 production is anything more than a temporary abnormal aftermath of restriction," says Mr. Holt, "each successive month of continued high production strengthens the theory that it is not a mere flash in the pan, but is a factor to be reckoned with for the future.

"The most satisfactory explanation of Malayan 1929 production is that Malayan acreage figures in general, and for native rubber in particular, have always been underestimated by British authorities, and that the per acre yield for native rubber has also been underestimated.

The RUBBER AGE

Published on the 10th and 25th of each month.
The Only Twice-a-Month Rubber Publication.

THE PALMERTON PUBLISHING CO., INC.

Editorial Office, 250 West 57th St., New York City

Telephones: Columbus 2923, 2924

THE RUBBER AGE is published on the 10th and 25th of each month by The Palmerton Publishing Co., Inc., a New York corporation. P. L. Palmerton, President; Earl D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer. Publication Office, 1-3 Peace St., New Brunswick, N. J. Subscription rates: Domestic, $2.00 a year; Canada, $2.50; foreign, $3.00; single copies, up to 3 months old, 20c; over 3 months old, 50c. Advertising rates on application.

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NEAR BUSINESS, SHOPPING and THEATRE CENTERS

NEWS of the INDUSTRY

Financial—Business
Building Operations
Personals
New Products

RUBBER MEN SPEAK AT AKRON CHAMBER MEETING

Rubber company officials were the principal speakers at the 22nd annual meeting of the Akron Chamber of Commerce, held at the local armory on November 20 and attended by more than 500 members. Confidence in the development of Akron, industrially and through civic progress, was expressed by all.

"There has been no step forward taken in Akron in the last 20 years that the Chamber of Commerce hasn't been back of and boosted," said C. W. Seiberling, vice-president of the Seiberling Rubber Company, in his talk. R. S. Wilson, vice-president of the Goodyear Tire & Rubber Company, pointed out that, considering the circulation of newspapers and magazines in which Akron companies advertise, more than 1,000,000,000 advertisements carry the name of Akron and its products into every country that has a printed language in a single year.

"Akron must build on service," Mr. Wilson concluded. "When I came to this city 17 years ago, Trenton, N. J., was a rubber centre of equal importance with Akron. Now Akron is the undisputed rubber centre of the world. while Trenton produces less rubber goods than it did 17 years ago."

J. H. Connors, general manager of the mechanical goods division of the B. F. Goodrich company, pointed out that Akron was developing a diversification of industry that would bring it even greater prosperity. B. M. Robinson, assistant secretary of the Firestone Tire & Rubber Company, made a plea for the co-operation of citizens with industry, and W. E. Fouse, vice-president of the General Tire & Rubber Company, reviewed the 20,000-mile flight of his company's "Sky Fleet."

New trustees of the chamber elected at the meeting include Charles J. Jahant, vice-president of the General Tire & Rubber Company; V. I. Montenyohl, treasurer of the B. F. Goodrich Company; and B. M. Robinson, assistant secretary of the Firestone Tire & Rubber Company. Among the retiring trustees were H. S. Firestone, Jr., vice-president of the Firestone Tire & Rubber Company; William O'Neil, president of the General Tire & Rubber Company; William Pfeiffer, president of the Miller Rubber Company; and James D. Tew, president of the B. F. Goodrich Company.

October Golf Ball Imports

Imports of golf balls during October numbered 56,484, valued at $18,154, a sharp decline from September when imports totaled 119,440 balls worth $39,226 and from October, 1928, when they amounted to 276,327 balls with a value of $117,428. The unit value per ball of the October imports was 32.1 cents, as compared with 32.8 cents in September and with 32.5 cents in August.

Rubber Tire Industry Index

The condition of the rubber tire industry in the United States is shown by the Department of Commerce indexes of business to have fallen off considerably in August and September from the high point reached during July. For the month of September, rubber tires were figured at 117 per cent of the 1923-25 monthly average, as compared with 114 in August, 141 in July, and 169 in September, 1928. These index numbers are designed to show the trend in production, prices, trade, etc., being made up of weighted combinations of series of individual relative numbers.

Akron Rubber Group Meets

A meeting of the Akron Rubber Group of the Rubber Division, American Chemical Society, was held on December 9 at the Clubhouse of the Firestone Tire & Rubber Company. Scheduled speakers were H. C. Young, of Chas. MacIntosh & Company, Ltd., Manchester, England, who spoke on "Some Engineering Problems of Rubber," and Dr. Warren Kendall Lewis, of the Massachusetts Institute of Technology, Cambridge, Mass. The meeting and the dinner which preceded it were well attended and several important business matters were discussed, a complete account of which will appear in the December 25 issue of THE RUBBER AGE.

POSTPONE SOLICITATION OF 1930 RUBBER ORDERS

In response to frequent requests from national and state organizations of shoe retailers, the rubber footwear manufacturers who are members of the Rubber Manufacturers' Association, Inc., unanimously recommended at a recent meeting that the dealers' views be met and that solicitation of rubber footwear orders for the 1930 season be started on February 1 instead of January 1, which has been the date for many years.

This will mean that the retailers' season will be more nearly at an end and their stocks in a healthier shape when they are called upon to meet the problem of their next season's purchases. It will also permit dealers to purchase with confidence during December the merchandise needed for sale in December or January with the knowledge that the new season's rubber lines will not be placed on the market until February 1.

McQUEEN HEADS SALES OF GENERAL TIRE & RUBBER

L. A. McQueen, widely known tire sales executive, has been appointed trade sales manager of the General Tire & Rubber Company, his appointment taking effect on December 1. For many years Mr. McQueen has been identified with tire merchandising, his resignation as general manager of tire sales for the B. F. Goodrich Company being announced in October.

Mr. McQueen left the B. F. Goodrich Company after starting 13 years ago as a clerk and working up to a position as head of one of the chief sales departments. After being graduated from the University of Wisconsin, Mr. McQueen came to Goodrich on the recommendation of the university president. In 1923, he was named advertising manager and served in that position until being named general manager of tire sales four years ago. In the latter position, he worked under T. G. Graham.

C. OLIN NORTH HEADS NEW CHEMICAL COMPANY

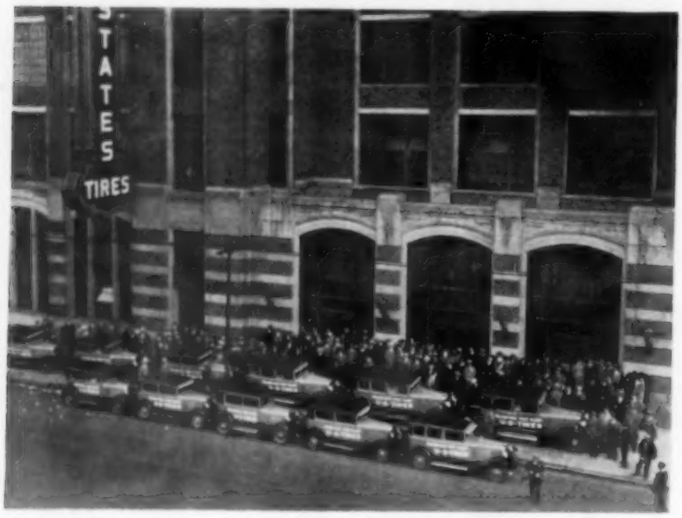
Kavalco Products, Inc., has recently been formed for the manufacture of aromatic chemicals. The new company owns a plant suitable for that purpose at Nitro, W. Va., and is now installing equipment with the intention of starting actual operation about January 15. The officers of the organization are C. Olin North, president and treasurer; W. D. Payne, vice-president; Winfield Scott, secretary and development manager; H. P. Roberts, superintendent; Dr. Max H, Hubacher, chief of research; and M. McMorrow, assistant secretary and assistant treasurer.

Mr. North was formerly secretary and treasurer of the Rubber Service Laboratories Company and the Elko Chemical Company, Akron, O., and Nitro, W. Va., and was one of the original incorporators of the former concern. When the company was absorbed by the Monsanto Chemical Works, he became vice-president in charge of rubber service development. The other officers and staff members of Kavalco Products, Inc., were also previously connected with the Rubber Service Laboratories Company.

Baldwin Declares Dividend

The Baldwin Rubber Company, Pontiac, Mich., manufacturer of automobile floor and running board mats and mechanical rubber goods, has declared a quarterly dividend of 37½ cents a share on its 49,980 outstanding shares of class A convertible preferred stock. The dividend is payable December 31 to stock of record at the close of business December 20.

United States Tire Test Fleet Heads South



THE "million mile test fleet" of the United States Rubber Company is now on its way to its winter operating grounds in Arizona. The fleet, which is shown above about to leave the Detroit factory of the company, operates over the highways of Michigan during the summer, but in the winter months is sent to Arizona because warm weather is necessary in adequate tire testing. More than 4,000,000 tire test miles are piled up by the fleet each year, according to the company.

RUBBER SAFETY GROUP ELECTS NEW OFFICERS

Officers of the Rubber Section of the National Safety Council, elected at the recent Chicago congress, are headed by J. T. Kidney, Goodyear Tire & Rubber Company, as general chairman; C. L. Hungerford, Firestone Tire & Rubber Company, vice-chairman; and S. Mansfield, Goodyear Tire & Rubber Company, secretary. Chairmen of the various committees include the following: posters, Roland Kastell, United States Rubber Company; health, L. J. D. Healy, Federal Rubber Company; program, A. D. Kunze, Rubber Manufacturers' Association; membership, A. P. Regal, Philadelphia Rubber Works Company; publicity, P. B. Martens, Ohio Industrial Commission; statistics, Howard W. Low, Miller Rubber Company; engineering, S. Mitchella, Republic Rubber Company; slides and safety kinks, J. E. Lynch, Fisk Rubber Company.

J. R. Hanson, United States Rubber Company, has been chosen as editor of the section's news-letter, and an advisory committee has been appointed to include W. L. Schneider, B. F. Goodrich Company; M. A. Quirk, United States Rubber Company; R. C. Salisbury, Federal Rubber Company; and E. W. Beck, United States Rubber Company.

Goodyear Paper Honored

Honorable mention has been awarded to the *Wingfoot Clan*, employes' house organ of the Goodyear Tire & Rubber Company, in the employes' magazine contest, conducted by the employes' publication section of the National Safety Council during the year 1929. The award was given for "excellence in the presentation of safety, for general appeal of editorial comments, and for attractiveness in physical make-up." H. M. Ensminger is editor of the paper.

NEW HAVEN SHERARDIZING PLANT IN $50,000 FIRE

A fire which caused a loss of more than $50,000 destroyed the Akron branch plant of the New Haven Sherardizing Company in the early morning of November 23. The inside of the factory building was completely destroyed, and such stocks as were not consumed by the flames were ruined by water.

The factory, which was a branch of the main plant of the company at Hartford, Conn., had been located in Akron for more than five years and for the past three years in the building on High Street which was destroyed by the fire. The plant was equipped to do rust proofing and metal finishing in all kinds of metal and also manufactured inner tube mandrels and calender shells.

Allan Speedy Visits U. S.

Allan Speedy, director of Binney & Smith & Ashby, Ltd., London, England, arrived at New York last month on the *Mauretania* for a five-week visit to the United States. During his stay, he will visit the carbon black plants of the Binney & Smith Company, the sulfur refineries of the Stauffer Chemical Company in Texas, and the accelerator plant of the Rubber Service Laboratories Company, his firm being agents for the products of these American companies in the United Kingdom. Mr. Speedy expects to renew his acquaintance with many of his friends in the industry, having been himself associated with the rubber division of A. G. Spalding & Brothers at Chicopee Falls, Mass., a number of years ago. He will also spend several days in Florida before returning to England.

RAYBESTOS-MANHATTAN VOTES COMMON DIVIDEND

Raybestos-Manhattan, Inc., has declared an initial quarterly dividend of 65 cents, payable December 16 to stock of record December 2, thus placing the common stock on a $2.60 annual basis. The company, which is the result of a merger of the Manhattan Rubber Manufacturing Company, the Raybestos Company and the United States Asbestos Company, has shown earnings for the first nine months of the current year equal to $4.60 a share on its common stock.

The balance sheet as of September 30 shows current assets of $11,363,520 and current liabilities of $1,183,345, a ratio of better than 9.6 to 1. Cash funds, including investments in municipal bonds, amounted to $3,769,029. There are no bank loans, bonds or preferred stock outstanding.

Lambertville Reorganized

The Lambertville Rubber Company, Lambertville, N. J., which was re-opened this year after the settlement of financial difficulties, has been incorporated with a capital of $900,000 for the purpose of manufacturing rubber footwear. The incorporators are Dr. Peter Fireman, Trenton, N. J., and John T. Crowley and William E. Crowley of Lambertville. The company has increased its working force to 200 and reports a good demand for its new lines.

General Atlas Changes Name

Effective immediately, the General Atlas Chemical Company, New York City, makers of "Gastex" black, will be known as the General Atlas Carbon Company.

The change is due to the similarity of the former name to that of another chemical company and has no effect on the firm's policy in any way.

Rubber Stocks Higher

Stocks of rubber manufacturing companies were generally higher than at the end of the previous fortnight. The new common and preferred issues of the Firestone Tire & Rubber Company were scheduled to be admitted to trading on the New York Stock Exchange on December 5. Prices of leading rubber company securities on December 4 compare as follows:

	Last Price Dec. 4	Nov. 18	High —1929—	Low
Ajax	2⅛	2½	11¼	2
Falls	—	—	11⅝	4
Faultless	38	35	45	30
Firestone	36	32⅛	41½	30
do. new 6% pfd.	86¼	83	98¾	79
Fisk	4	4½	20⅛	3½
do. 1st pfd.	16	20	72½	15
General	—	—	298	236
do. pfd.	90	—	102	92
Goodrich	46¼	47½	105¾	42
do. pfd.	99⅞	—	115¼	98⅛
Goodyear Com.	69¼	65⅞	154½	60
do. pr. pfd.	94	91¼	104⅞	87
India	—	20	73	19
Intercontinental	5½	6⅞	14¼	2
Kelly Springfield	4⅜	5	24	3⅞
do. 1st pfd.	36½	28	100	28
Lee	6⅝	7	25	5
Miller	5⅛	6⅞	28¾	5⅛
do. pfd.	24	30	83	24
Mohawk	12½	12	66	10
do. pfd.	—	—	90½	78
Norwalk	—	1½	6⅛	⅝
Pirelli	47¼	47⅝	68	43¼
Seiberling	15	17⅞	65	15
do. pfd.	—	—	107⅞	90
U. S. Rubber	28⅛	25⅛	65	15
do. pfd.	50⅝	47¾	92½	40⅛

Names in the News

B. F. SCHLEICHER, vice-president of the Samson Tire & Rubber Company, returned to Los Angeles last month after an extended trip through the eastern states, where he visited the larger distributing centres. He declared his surprise at the feeling generally expressed throughout the country that Los Angeles is destined to be one of the most important automotive centres of the United States.

PAUL E. GLEICHAUF, district export manager of the Goodyear Tire & Rubber Company, was a speaker before the meeting of the Eskimo Club of Akron on November 13. He described his travels in China, Japan, Korea, the Philippine Islands and South Africa.

F. B. DAVIS, JR., president of the United States Rubber Company, was a guest of F. A. SEIBERLING, president of the Seiberling Rubber Company, at the latter's Akron home for several days last month. Mr. Davis and Mr. Seiberling were among the Akron district rabbit hunters on November 15, the first day of the Ohio open season.

FRANK P. HAMON, office manager of the B. F. Goodrich Company for the last ten years, has resigned and has been succeeded by H. M. LACEY. Mr. Hamon came to Akron after 19 years with the Otis Elevator Company in its New York and Chicago offices.

ABRAHAM LOPEZ CARDOZO, of Cardozo & Boekman's Handelmaatschappy, N. V., Amsterdam, Holland, has been elected to membership in the Rubber Exchange of New York.

EDWARD B. DOLTON, formerly connected with the Murray Rubber Company, Trenton, N. J., is now engaged in the brokerage business at Trenton.

RALPH W. STODDARD of Grand Rapids, Mich., formerly connected with the Corduroy Tire Company, has been appointed by the Murray Rubber Company, Trenton, N. J., to take charge of its middle west territory. RAY H. PADDOCK, formerly sales manager, is now supervising the opening of new chain stores for the Murray Rubber Company throughout the eastern states from New England to Florida.

J. EDWARD MYERS, superintendent of the Acme Rubber Company, Trenton, N. J., is at present acting as one of the leaders in the membership drive for the Trenton Young Men's Christian Association.

R. H. MINER, attorney for the Goodyear Tire & Rubber Company, was named last month by Governor Myers Y. Cooper of Ohio as a member of the committee of 100 to formulate new taxation laws for the state in accordance with the classification tax amendment adopted at the recent election.

KING DAVID

AN INFORMAL pose of D. C. Scott, Treasurer of the Henry L. Scott Co., Skipper of the *Scottie* and Commodore of the Rhode Island Yacht Club at Providence. Not only is "Dave" Scott well-known and well-liked by his many friends throughout the rubber industry, but his yacht, the *Scottie*, is equally well known to those celebrated "week-enders" who have spent many an enjoyable hour cruising around Narragansett Bay. The yachting cap surmounting Dave's smiling countenance is one of his most highly prized treasures, being the gift of his guests at a dinner held in Boston following a memorable week-end cruise last Fall after the Swampscott meeting of the Rubber Division.

DR. ZAY JEFFRIES, consulting metallurgist, was the speaker at the second employes' meeting of the Goodyear Tire & Rubber Company, held on November 23 at the Goodyear Theatre in Akron. The subject of his talk was "Science in Industry."

DR. WOLFGANG KLEMPERER, aeronautical engineer of the Goodyear-Zeppelin Corporation, took part in two glider carnivals at Detroit in connection with National Glider Week last month. At a banquet on November 23 he was presented with a three-star insignia for his work in soaring flights.

LEE SCHOENHAIR, pilot of the "Miss Silvertown" airplane of the B. F. Goodrich Company, returned with his ship to Akron late last month after a trip to Los Angeles. On his western flight he carried with him an exhibit of Goodrich aeronautical products for display at the Western Air Exhibition held at Los Angeles.

ROBERT S. BARRABEE, New York University football star and All-American end for the 1928 season, has entered the sales school of the Firestone Tire & Rubber Company at Akron, O. In joining the company, he is following his two brothers, FRANK and SAMUEL L. BARRABEE, of Samuel L. Barrabee, Inc., Boston, Mass., leading Firestone distributor of New England.

JAMES D. TEW, president of the B. F. Goodrich Company, and C. W. SEIBERLING, vice-president of the Seiberling Rubber Company, were speakers at the Akron City Club last month at a meeting of division chairmen and team captains for the 1930 Community Fund campaign. The object of the campaign is to raise $659,500 for relief and welfare agencies in Akron.

WILLIAM C. YOUNG, aeronautical engineer of the Goodyear-Zeppelin Corporation, spoke before members of the Rotary Club of Youngstown, O., on November 27. The subject of his talk was "Airplane and Airship Transportation."

HARVEY S. FIRESTONE, president of the Firestone Tire & Rubber Company, made a congratulatory talk to the 200 dealers of his company who were winners in the annual "world series pennant" sales contest conducted during September and October. The dealers, who were awarded $25,000 in gold as prizes, arrived in Akron on November 21 for a three-day visit to the Firestone factories and a program of entertainment.

ROBERT LEE, formerly general sales manager of the Thermoid Rubber Company, has been elected vice-president of the Thermoid Company and will be associated in the general management of the new holding company with ROBERT J. STOKES, president, and JOSEPH O. BAUR, secretary and treasurer. JAMES A. WHEATLEY, JR., formerly Pacific Coast manager, has been promoted to sales manager of the automotive division, and LLOYD R. LEAVER, formerly Chicago manager of mechanical rubber goods, to sales manager of the mechanical rubber goods division.

CARL K. WOLFE, of the sales staff of the Norwalk Tire & Rubber Company, Norwalk, Conn., has been promoted to the position of sales promotion and advertising manager.

HUGH ALLEN, public relations director of the Goodyear Tire & Rubber Company, spoke on November 19 before the publicity committee of the Akron Junior Red Cross, including several editors of school publications. He advised them of the best means of obtaining publicity.

I. W. BRANDEL, sales manager of the Chemical Rubber Company, Cleveland, O., addressed students of the Lash High School, Zanesville, O., on the morning of November 20.

Rubber News Around the World

GUTTA PERCHA COMPANY REPORTS BETTER YEAR

Although there is an increase of only £416 at £208,395 in the gross profits of the India Rubber, Gutta Percha & Telegraph Works Company for the year ended August 31, the net profits are £22,592 up at £22,828, chiefly owing to a reduction in the item of expenses comprising salaries, commission, taxes and general expenses. A dividend of 2½ per cent, tax free, is to be paid on the ordinary capital. The previous dividend was 5 per cent for 1925-6.

The past year's turnover was smaller than in 1927-28, although the actual output was well maintained. A marked recovery has taken place at Persan, both as regards profits and turnover. The board fully realizes that increased profits are now dependent mainly upon larger sales, and attention is being given to this problem.

UNITED STATES IS FIRST IN HARD RUBBER EXPORTS

The United States ranks high among exporters of hard-rubber goods, with Canada as the leading market, the rubber division of the Department of Commerce states. Exports during the first half of 1929 amounted to 58 per cent of total exports of these products for the entire year of 1928. Hard-rubber goods shipped from the United States have averaged a value of $769,600 for the last five years, it was stated.

Canada is our best market, taking 34 per cent of the total value in 1928. The United Kingdom is the second market, although export values have been declining steadily since 1925. France, which was in third place in 1925, with a value exceeding $100,000, but dropped to sixth place in 1927, has now climbed to fifth place. Japan seems to increase steadily each year. Chile took a value of $16,557 in 1928, and China $11,019.

Rubber Factory in Bulgaria

The first modern rubber goods factory in Bulgaria recently commenced production in the city of Sofia. It is under the management of the firm of Bakish Brothers.

CATALPO
for
Mechanicals

American Tire Manufacturer Considering Mexican Plant

It is reported, according to Assistant Trade Commissioner Walter E. Aylor, that a well known American manufacturer of tires is making a study of local conditions with the end in view of establishing a branch manufacturing plant at Toluca, Mexico Definite steps, however, are considered improbable until the much discussed labor legislation is satisfactorily disposed of and the new president permanently installed in office.

Live Wire Co. Name Changed

The Live Wire Company, Ltd., Guelph, Ont., will in the future be known as the Federal Wire & Cable Company, Ltd. This change in no way affects the policy of the company, its officers, or the capital structure, but only has to do with the corporate name.

Dye Trust Buys Rubber Firm

It is reported that there is little ground for the rumor that the I. G. Farbenindustrie (German Dye Trust) is ready to manufacture artificial rubber on a commercial basis. The rumor is connected with the fact that the Trust has negotiated with the Rhenish Rubber Works for the transfer to it of the premises of that firm. The acquisition is stated to affect rather the interest of both firms in the joint manufacture of celluloid.

U. S. Leads Footwear Exports

Comparative statistics compiled by the Department of Commerce show that the United States is the leading exporter of rubber boots and shoes and canvas rubber-soled shoes for the first nine months of 1929. During that period, it is figured that the United States exported 9,931,805 pairs; Canada, 8,423,657 pairs, and the United Kingdom, 3,082,548 pairs. In the first nine months of 1928, the United States exported 6,974,770 pairs; Canada, 6,921,483 pairs, and the United Kingdom, 2,450,640 pairs.

Beaded Tires Obsolete

The wired or straight-side pneumatic tire has now almost completely superseded the beaded-edged type in the United Kingdom. The beaded-edged tire is practically obsolete throughout the British Isles. The wired type which has replaced it is directly evolved from the Dunlop wired cycle tire of 1891, and its principle is now successfully and almost exclusively applied to cycle, motorcycle, auto, giant pneumatic and airplane tires. In other countries, however, there are still many thousands of cars in existence using beaded-edged tires.

DUNLOP-PERDRIAU GROSS FOR YEAR IS $4,945,000

The first financial report of the Dunlop-Perdriau Rubber Company, Ltd., Melbourne, for the year ended June 30, 1929, showed gross profits, including the profit to the Perdriau section (after deducting the interim dividend) of £1,015,438 ($4,945,000), and net profit of the two sections of the business (after making provision for depreciation and taxation) of £549,931.

A dividend was paid to the Perdriau shareholders out of the profits of that section of the business for the nine months up to March 31, 1929, in terms of the amalgamation agreement. This absorbed £138,300, leaving a balance of £411,630, to which is added the balance brought forward from last year, £1,137.

After deducting the interim dividend paid last April at the rate of 10 per cent per annum, on the cumulative preference shares and ordinary shares for the nine months to March 31, 1928, amounting to £187,629, there was a balance of £225,137. Out of this it was decided to pay a dividend at the rate of 10 per cent per annum for the quarter to June 30, 1929, on 930,000 cumulative preference shares, and 3,764,151 ordinary shares, requiring £117,353; and to transfer £50,000 to the general reserve, leaving £57,783 to be carried forward.

For the previous year the Dunlop Company sustained a net loss of £36,452, through the fall in the price of raw rubber. The Perdriau Company made £213,393 net profit. The Barnet Glass Rubber Company, Limited, whose 550,000 ordinary £1 shares the Dunlop Company offered to purchase, and had acquired all but a few hundred of them up to September 11 last, made for the year to June 30, 1928, £104,037 net profit, and for the year to June 30, 1929, net profit amounting to £127,637. The dividend of 10 per cent paid on the ordinary shares absorbed £55,000. To pay dividends for the 12 months on the capital of the Dunlop Perdriau Company requires £469,415, or £80,516 less than the net profit disclosed for the year ended June 30 last.

Industrial Chemistry Congress

The ninth congress of the Societe de Chemie Industrielle was held at Barcelona, Spain, from October 13 to 19, with delegates from ten or more countries in attendance. The United States was not officially represented, although several American chemists were present, and the few individual exhibits of American products were made by Spanish agents. Numerous papers were read during the sessions held, the largest number being given in the group on organic industries, including reports on rubber, dyes, resins, cellulose, paper and plastics.

Rubber Goods and Specialties

Fisk Airplane Tire

Production on a line of airplane tires has been started by the Fisk Rubber Company, Chicopee Falls, Mass. At present the company is manufacturing from four-inch to eight-inch tires, the largest being thirty-six inches in diameter, all smooth tread. The tires are made much like automobile tires, the same all-cord fabric being used and the

multiple cable bead construction employed. The basic principle in airplane tires is to obtain maximum strength with minimum weight, and most of the new tires are of four-ply construction and are built by the Fisk semi-flat drum method. The present line covers all except the very largest planes, and Fisk engineers expect to produce tires in sizes up to 14 inches to support the largest ships flown.

Las-Stik Haf-Sole

Rubber half soles which can be cemented to old or new shoes to provide a resilient, non-skidding surface are now being offered by the Las-Stik Manufacturing Company, Hamilton, O. According to the manufacturer, the Las-Stik Haf-Sole can be applied in less than twenty minutes and will outwear any leather sole. These half soles can

be applied without removing the old sole from the shoe and are said to be equally serviceable on golashes, rubber boots, rubbers, hunting boots and other footwear. Las-Stik Haf-Soles will not mark up floors and will leave no black streaks through the house where children race and slide on floors.

The St. Louis Southwestern Railway has introduced a new method of handling short-haul small-shipment freight by placing steel freight cars on the highways, equipped with pneumatic tires. A tractor hauls a train of these vehicles, which are a sort of specially adapted railroad box car with both side and rear doors.

Cellophane Wrapped Tire

The General Tire & Rubber Company, Akron, O., is marketing its eight-ply "super" balloon casings wrapped in a special covering of Cellophane. This protects the tire in the dealer's shop while at the same time allowing the customer to see it clearly and to distinguish the embossing of the name and the design of the tread. The covering is of two-inch Cellophane with an overwrap of kraft paper, which can be removed by the dealer. The tire may be rolled about the shop without gathering dust or losing its new appearance.

Pneumatic Water Shoes

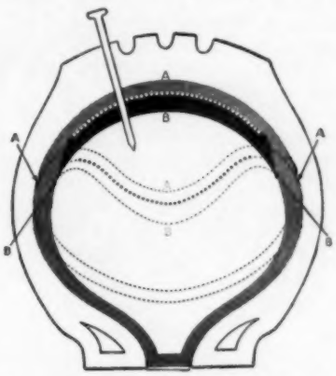
J. Hazzard, an English inventor, has developed a shoe with which it is possible to walk on water without excessive inconvenience. Each shoe is made with a large pneumatic cushion as its base, and the user is also aided by a wooden staff with an air-filled cushion base to help him maintain his balance. The inventor believes that the new shoes may revolutionize the sport of fishing and may also be used advantageously by spectators at water sports carnivals.

Rubber-Like Asphalt

To produce an artificial rubber-like asphalt, under a method recently patented by H. Hunziker, a Swiss inventor, a dispersion of at least one vulcanized non-bituminous substance, such as vulcanized oil or rubber, is prepared by heating and stirring with at least one bituminous substance—pitch, petrol-asphalt, or the like—preferably in the presence of a relatively large quantity of sulfur, with or without a solvent for vulcanized oil, such as ethylene trichloride. Instead of using sulfur, the process may be carried out by heating the substances under pressure or by dissolving or dispersing the vulcanized substance in a solvent which mixes with the bituminous substance. The product may be mixed with sand or other suitable filler to form a powdery or plastic mass.

Goodrich Air Container

The Goodrich Air Container is the name of a new puncture-sealing automobile inner tube introduced by the B. F. Goodrich Company, Akron, O. Like an ordinary inner tube in appearance, the Goodrich Air Container is said to be tougher, thicker and more resilient and based on an entirely different principle. Where an ordinary inner tube



is built to stretch, thus making itself vulnerable to puncture, the Air Container is built to work under compression. If this new tube is pierced by a nail, the compressed rubber tightly grips it without loss of air; and when the nail is withdrawn, the compressed rubber instantly seals itself. The tube is also said to help tires resist sidewall breakdown, because the pliable bridge of even the heaviest oversize casing against compressed rubber reinforced and protects everyday wear. A patented feature is a cord ply insert similar to the cord ply used in the construction of tires.

Tubby-Tot Waterproof Doll

Made of flesh colored rubberized cloth and stuffed with Kapok, the new Tubby-Tot doll is suitable for camp, bathing beaches, touring and any other purpose where break-

able or other more fancy dolls would be decidedly out of place. The doll is 13 inches tall, has a most attractively colored face and is dressed in bathing suit and cap of red or green rubberized cloth, with belt and buckle.

Current Crude Rubber Items

SUMATRA RUBBER OUTPUT IS STEADILY INCREASING

The British Department of Overseas Trade has issued extracts from the report of the Medan Chamber of Commerce last year, which was a remarkable year for the east coast of Sumatra in many respects. At the end of 1924, the area planted with rubber was about 180,000 hectares, and the production per productive hectare was 331 kilograms, or a total of nearly 60,000 tons. At the end of 1928, not only had the planted area risen to 240,000 hectares, but the mean production per productive hectare had risen to 426 kilograms; the potential production is thus now over 100,000 tons.

One important rubber-producing group has already reached a mean of 557 per hectare. Should the entire planted area reach this mean, which is naturally quite within the limits of possibility, there would be a potential production of 135,000 tons.

Sumatra Para Raises Dividend

The Sumatra Para Rubber Company reports a profit for the year ended June 30 last of £20,601 after provision for the depreciation of buildings and machinery. The directors propose to pay a dividend of 10 per cent as compared with 6¼ per cent in the previous year. The crop harvested was 1,540,921 pounds, and the estimated crop for the current year is 1,750,000 pounds.

Brooklands Selangor Increase

The Brooklands Selangor Rubber Company, Ltd., earning nearly 20 per cent on its share capital, has raised its dividend from 10 to 15 per cent. In the year ended June 30 last, the company earned £34,327, as against £18,950 in the previous twelve months. From 3,384 acres mature the yield came to 1,525,770 pounds and, in addition, the surplus production of previous seasons, amounting to 507,320 pounds, has been brought to account, making a total of 2,033,090 pounds dealt with. Last year only 847,429 pounds were taken into account. For the 1929-30 year the manager estimates a crop of 1,500,000 pounds.

Rubana Estate Profit

The Rubana Rubber Estates, Ltd., controlled by the Straits Rubber Company, has reported a profit for the year ended June 30, 1929, of £48,674, as compared with £32,297 in 1927-28 and with £64,787 in 1926-27. The dividend rate, which was reduced from 15 per cent to 5 per cent a year ago, has been restored to 10 per cent, but as this is satisfied with £33,000, a sum of £15,673 was earned in excess of dividends. Situated in Perak, F. M. S., the Rubana property is 4,918 acres in extent and has 4,537 acres planted out in rubber. The yield, which was kept down to 902,314 pounds in 1927-28, increased to 1,713,737 pounds in the year ended June 30, the crop being equivalent to 467 pounds per acre.

DUTCH WILL NOT PROTEST BLAINE RUBBER MEASURE

The Dutch government will not convey any formal representations to the Department of State with respect to the Blaine tariff amendment excluding from the country products of indentured labor under penal sanction. The Hague has studied the documents relative to the Blaine amendment, which may have the effect of excluding much crude rubber produced in the Dutch East Indies, and has notified the Netherlands legation at Washington of its cognizance of them. It feels, however, that formal conservations between the two governments would be futile and, therefore, intends to let matters take their course.

It has been pointed out that the International Labor Bureau at Geneva, in which America and 50 other countries are represented, now has its commission experts studying this question. Spokesmen for Dutch interests claim that the indentured system is both humane and efficient, is based on purely voluntary contracts, and tends to insure housing and sanitary conditions in Sumatra and other islands where it is employed. The "penal sanction" clause, it is said, means merely that those who run away are placed at road work, as confinement is not resorted to.

Talks on Bud Grafting

Developments that have taken place in the Dutch East Indies in regard to planting and the desirability of using such material to better the existing state of the planting in Ceylon as well as the importance of further research were the features discussed in a recent lecture on "Bud Grafting" under the auspices of the Low Country Products Association at Colombo. The lecturer, L. Lord of the Ceylon Agricultural Department, described selection and showed why it was necessary in planting rubber.

The London *Daily Telegraph* published with its issue of November 19, a 44-page supplement on the British rubber industry.

Closing Prices on Rubber Exchange of New York, Inc.

FROM NOVEMBER 19 TO DECEMBER 3, 1929

		Spot	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Sales*
Nov.	19	16.50	16.70	17.00	17.40	17.70	17.90	18.00	18.20	18.30	18.50	18.80	19.00	——	471
	20	16.10	16.30	16.60	16.90	17.30	17.50	17.70	17.90	18.10	18.30	18.40	18.60	——	624
	21	15.80	16.00	16.30	16.60	16.90	17.20	17.40	17.60	17.70	17.90	18.00	18.20	——	648
	22	15.80	16.00	16.30	16.70	17.00	17.30	17.50	17.70	17.80	18.10	18.20	18.30	——	368
	23	15.70	16.00	16.30	16.70	17.10	17.40	17.50	17.80	17.90	18.10	18.20	18.40	——	241
	25	16.00	16.00	16.40	16.70	17.10	17.30	17.60	17.80	17.90	18.20	18.40	18.60	——	410
	26	16.10	16.10	16.60	16.80	17.10	17.30	17.60	17.80	18.00	18.20	18.50	18.70	——	394
	27	16.10	16.00	16.30	16.60	16.90	17.10	17.30	17.50	17.80	17.90	18.10	18.30	——	628
	29	16.00	15.90	16.30	16.60	16.90	17.10	17.30	17.50	17.80	18.00	18.20	18.40	——	406
	30	16.20	16.00	16.40	16.70	17.00	17.20	17.40	17.60	17.90	18.10	18.30	18.50	——	27
Dec.	2	16.10	15.90	16.30	16.60	16.90	17.10	17.30	17.50	17.80	18.00	18.20	18.40	18.60	40
	3	16.10	15.90	16.20	16.50	16.80	17.00	17.20	17.40	17.70	17.90	18.20	18.40	18.60	350

*In lots of 2½ tons each

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GOODRICH PLANS TO USE LARGER "SILVER FLEET"

Following closely on completion of the 30,000-mile tour of the 1929 Goodrich Silver Fleet comes the announcement from testing headquarters of the B. F. Goodrich Company here that an even larger Silver Fleet is beginning the 1930 period of tire testing and tire demonstration. This fleet will be broken into several squadrons, each squadron operating in a different part of the country. The new fleet is comprised of 17 cars.

A fleet of five cars including two big White trucks has been dispatched to Gainesville, Fla., for testing and demonstration. Another division of the 1930 Fleet is operating in California and other western states of semi-tropical climate. One division will work from Akron headquarters.

The operation of the fleet in squadrons of several cars each gives tire engineers actual operating conditions in various parts of the country and furnishes data from which to determine the rate of wear under these various conditions. Winter snow and ice counteract friction to some extent and friction and heat are the worst enemies to tires. Warm winter climates are sought for testing tires under conditions that exist in the north during the summer season.

Patents Assigned to Goodyear

Patents awarded to six Akron inventors last month have been assigned to the Goodyear Tire & Rubber Company. Elov F. Maas, inventor of a squeegee applier, assigned his device to the Goodyear company, as did Cornelius Van Rennes, inventor of an air bag valve; John B. Tiffany, apparatus for constructing tubes; Wallace H. Campbell, tube deflating machine; Elmer Kirmich, belt joint; and Jorgen I. Haase, tire building machine.

Rubber Freight Rates

The tentative report of the examiner in Docket No. 21333, Rubber Association of America, Inc., vs. A. & B. B. Railroad, et al., recommends the dismissal of the case, holding that the ratings on crude rubber in carloads in Classification territory are not unreasonable. The Southern Freight Association Submittal No. 47569 proposes to establish a rate of 43½c per 100 lbs. on scrap rubber, carloads, from Roanoke Junction, N. C., to Oaks, Pa.; Submittal No. 47602 proposes a reduction in the rate on scrap rubber, minimum weight 30,000 lbs., from Moultrie, Ga., to Gadsden, Ala., from 52c to 35c per 100 lbs.; Submittal No. 47607 proposes to establish a rate of 32c per 100 lbs. on scrap rubber, carloads, from Riverton, Ala., and Iuka, Miss., to Gadsden, Ala., and 33c per 100 lbs. from Corinth, Miss.; and Submittal No. 47608 proposes to establish a rate of 46½c per 100 lbs. from Albemarle, N. C., to Oaks, Pa.

Xylos "Get Together" Banquet

The annual "Get Together" banquet for factory and office men of the Xylos Rubber Company, Akron, O., was held October 12 at Schurn's Tavern on the Portage Lakes Road and featured a fine program of music and talks. C. B. Emmerich was toastmaster, and the speakers were V. H. Dingmon, "The Development of Reclaimed Rubber as an Industry"; M. J. Thomas, "Co-operation and Mechanical Progress"; Earl Pugh, "Safety First"; M. J. Linn, W. W. Lawler, John McGraw and Ira Miller. Earl Williamson sang several tenor solos.

Receiver for Rodic Rubber

Federal Judge Runyon has appointed Samuel R. Fletcher, of Jersey City, N. J., equity receiver for the Rodic Rubber Company, Garwood, N. J., ordering him to continue the business. The firm claims to have lost $1,000 a month for the past ten months. The equity suit was filed by Raymond Haley, of White Plains, N. Y., who alleges the company's assets amount to $137,000, with liabilities of $67,750. Mr. Haley is a stockholder in the company and also holds an unpaid note for $2,000.

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GOODYEAR DIRIGIBLES TO PROCEED TO MIAMI

The six baby dirigibles of the Goodyear Tire & Rubber Company will go to Miami, Fla., this winter and are expected to arrive in time to take part in the celebration of the all-American air meet and in the dedication of the municipal dirigible airport at that city on January 13, 14 and 15. The blimps which will make the journey to the Florida city are the *Puritan, Pilgrim, Mayflower, Vigilant, Volunteer* and *Defender.*

"Miami, Fla., will be the training school for admirals of future airliners," P. W. Litchfield, president of the Goodyear Tire & Rubber Company and the Goodyear-Zeppelin Corporation was reported by newspapers as saying. "These baby Zeppelins are the forerunners of the day when their big 100-passenger sisters will carry a goodly share of the burden of intercontinental transportation, tons of mail, express and passengers. These lighter-than-air craft always attract attention. Such feats as landing between skyscrapers of a great metropolis and coming to a dead halt in the skies cannot help but prove the adaptability and possibilities of these ships."

U. S. Sells New Brunswick Site

The United States Rubber Company has sold a parcel of its land on Albany Street, New Brunswick, N. J., for a price reported to be in the neighborhood of $50,000. Negotiations are under way for the sale of the plant of the India Rubber Company, a discontinued subsidiary, which is located on Washington Street in the same city.

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LATE MARKET PRICES

Crude, Scrap & Reclaimed Rubber - Cottons and Fabrics

NEW YORK, DECEMBER 3, 1929

COTTON

DURING the month of November, the average spot closing price for middling upland cotton was 17.53 cents a pound, as compared with 18.46 cents during October and with 19.84 cents during November, 1928. This monthly average price was the lowest that has been recorded since June, 1927, and, while largely due to the securities market decline, was also influenced by the lack of strength in the commodity itself.

The action of the Federal Farm Board in enabling co-operative associations to make loans to growers on the basis of 16 cents a pound for middling cotton of ⅞-inch staple has already resulted in borrowings in excess of $22,000,000, and some interests believe that this course will have the effect of increasing production next year and further depressing prices.

The consumption of cotton by domestic mills during October to the amount of 640,798 bales was the largest on record for the month, but the inability of manufacturers to avoid accumulations of finished goods is still causing alarm. The statistical position in general remains unchanged.

	High Dec. 3	Low	Close	Close Nov. 18
Dec.	17.41	17.06	17.37	17.28
Jan.	17.50	17.21	17.48	17.42
Mar.	17.80	17.50	17.77	——

Tire Fabrics

Consumption of cotton fabric in the tire industry during September amounted to 18,198,733 pounds, as compared with 21,070,377 pounds in the month of August. The total consumption in the first nine months of 1929 amounted to 235,136,560 pounds, as compared with 195,776,417 pounds for the corresponding period of 1928. This consumption for the first three quarters of the current year practically equals the entire 1927 consumption of 237,306,424 pounds. Late prices follow:

CORD			
Peeler, carded, 23/5/3	lb.	.44¾@	.45¼
Peeler, carded, 23/4/3	lb.	.45½@	.46
Peeler, carded, 13/3/3	lb.	.41¾@	.42¼
Peeler, carded, 15/3/3	lb.	.42¾@	.43¼
Egyptian, carded, 23/5/3	lb.	.49½@	.50
Egyptian, combed, 23/5/3	lb.	.55½@	.56
CHAFERS			
Carded, American, 8 oz.	lb.	.38 @	.39
Carded, American, 10 oz.	lb.	.38½@	.39
Carded, American, 12 oz.	lb.	.38 @	.39
Carded, American, 14 oz.	lb.	.37½@	.43
LENO BREAKER			
Carded, American, 8¼ oz.	lb.	.39 @	.43
Carded, American, 10¼ oz.	lb.	.39 @	.43
SQUARE WOVEN			
Carded, American, 17¼ oz. 23-11 ply	lb.	.44½@	.45½
Carded, American, 17¼ oz. 10-ply	lb.	.37½@	.38½

Sheetings

Late sheeting prices, showing slight declines, are reported as follows by the Textile Brokers Association:

40-inch, 2.50-yard	yd.	— @	.12
40-inch, 2.85-yard	yd.	.10½@	.10¾
40-inch, 3.15-yard	yd.	— @	.11
40-inch, 3.60-yard	yd.	— @	.09¼
40-inch, 3.75-yard	yd.	.08⅝@	.08¾
40-inch, 4.25-yard	yd.	.07⅝@	.07¾

Ducks

The trend of the market for cotton ducks was slightly lower during the fortnight, but the demand continued to be only scattered with buyers filling in here and there on light amounts of goods. Latest price quotations were as follows:

Belting and Hose	lb.	— @	.36
Enameling	lb.	.34 @	.36
Single filling	lb.	.14½@	.15½
Double filling	lb.	— @	.17

RECLAIMED RUBBER

According to the statistics compiled by the Rubber Manufacturers Association from its questionnaire for the third quarter of 1929, the total consumption of reclaimed rubber during July, August and September was 56,963 long tons. During the same period, the production of reclaimed rubber amounted to 58,040 long tons. The amount of reclaim consumed in the three months was equal to 50.08 per cent of the total amount of crude rubber absorbed, according to the same report. This is a higher percentage than those derived from the monthly reports of the association for crude and reclaimed rubber consumption. Based on the latter figures, the proportion of reclaim used to crude in July, August and September was only 48.7, 47.6 and 49.2 per cent, respectively. Late prices follow:

High Tensile			
Super-Reclaim No. 1 Black	lb.	.12 @	.12¼
High Tensile Red	lb.	.11 @	.11½
Shoe			
Unwashed	lb.	.07 @	.07¼
Washed	lb.	.09¾@	.10
Tube			
No. 1 (Floating)	lb.	.12½@	.13
No. 2 (compounded)	lb.	.10 @	.10¼
Tires			
Black	lb.	.07 @	.07¼
Black, selected tires	lb.	.07¼@	.07½
Dark Gray	lb.	.08⅜@	.09
Light Gray	lb.	.09⅜@	.10¼
White	lb.	.11½@	.12
Truck, Heavy Gravity	lb.	.07 @	.07¼
Truck, Light Gravity	lb.	.07¼@	.07½
Miscellaneous			
Mechanical Blends	lb	.06½@	.07
Red	lb	.11¼@	.12

Scrap Rubber

The market for scrap rubber was inactive and little changed in the period, prices closing as follows:

(Prices to Consumer)

Auto tire peelings	ton	35.00	@37.50
Standard White auto	ton	45.00	@47.50
Mixed auto	ton	22.50	@23.00
Bicycle tires	ton	18.50	@20.00
Clean solid truck tires	ton	24.00	@25.00
Boots and shoes	cwt.	1.45	@ 1.50
Arctics, untrimmed	lb.	.00¾	@ .01
Inner tubes, No. 1	lb.	.07¾	@ .08
Inner tubes, No. 2, compounded	lb.	.04¼	@ .04¼
Inner Tubes, Red	lb.	.04¼	@ .04⅜
Air Brake Hose	ton	25.00	@27.50
Rubber Hose	ton	17.50	@20.00

CRUDE RUBBER

PRICE quotations for crude rubber during November were not only the lowest for the current year, but lower in their average than for any month since September, 1922. The average of the daily spot closing prices for ribbed smoked sheets last month was 16.62 cents a pound, as compared with 19.67 cents in October and with 18.26 cents in November, 1928. Aside from the period from February to September, 1922, this is probably the lowest price that has ever prevailed in the history of the industry.

Reports of co-operative selling by the members of the Rubber Growers Association and of similar efforts on the part of the Dutch growers have apparently been discounted in the past few weeks. These announcements temporarily gave strength to the market in the latter part of November, bringing quotations for a time up to the 17-cent level. Recessions soon followed, however, and the present state of the commodity is indicated by the fact that December rubber was selling as low as 15.80 cents a pound on the Rubber Exchange on December 3.

Trading in the December delivery on the New York Exchange was the heaviest ever recorded in any single month on that market. The turnover in this position amounted to 110,227½ long tons up to and including November 25. The previous record for heavy trading was established in the September position this year, in which the dealings totaled 109,662½ long tons.

The course of the New York outside market has been similar to that of the exchange, the closing price on December 3 being 16¼ cents a pound, a half cent down from the close on November 18. The market for actuals is generally at a low ebb, with manufacturers waiting for a definite sign of the coming trend. With inventory time approaching at the rubber plants, there is no desire to increase stocks at present.

Prices quoted on the New York outside market on December 3 were as follows:

Plantations—			
Ribbed Smoked Sheets— Spot-Dec.	.16 @		.16¼
Jan.-Mar.	.16¾@		.17
Apr.-June	.17¼@		.17½
First Latex, crepe spot	.17 @		.17¼
Amber Crepe, No. 2	.14 @		.14⅛
Amber Crepe, No. 3	.13⅝@		.13⅞
Amber Crepe No. 4	.13 @		.13⅜
Brown Crepe, Clean thin	.13½@		.13¾
Brown Crepe, specky	.12¾@		.13¼
Liquid Latex, per gal.	.90 @		
Paras—			
Up-river Fine	.16½@		—
Up-river Medium	Nominal		
Up-river Coarse	.08¾@		—
Acre Bolivian, fine	.16¾@		—
Caucho Ball, Upper	.08¾@		—
Islands, fine	Nominal		
Centrals—			
Central, scrap	.08¼@		—
Esmeraldas	.08¼@		—
Balata—			
Block, Colombia	Nominal		
Block, Ciudad	.51 @		.52

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers			
Spot-Dec.	7⅞@		8d
Jan.-Mar.	8 @		8⅛d
Apr.-June	8⅛@		8⅛d

SINGAPORE MARKET

Spot	— @		7⅝d

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LATE RUBBER CHEMICAL PRICES

Accelerators—Colors—Softeners—Compounding Materials

NEW YORK, December 5.—How important an aspect is being assumed by export markets for rubber compounding materials is indicated by the organization this month of the Carbon Black Export Association, Inc., under the Webb-Pomerene Act. Carbon black shipments from this country during 1929 are estimated at a total of nearly 100,000,000 pounds, with all parts of the world as recipients. This increasing export field not only for carbon black, but for all types of American rubber chemicals and compounding ingredients, is believed likely to aid in stabilizing prices by assuring a market for products of domestic producers even when the rubber industry in this country is in a period of recession.

No price changes have been reported during the fortnight, and trend of contract orders being placed for 1930 would seem to indicate that no such changes are being contemplated in the near future.

ACCELERATORS

Organic				
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16¼
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.42	@	.44½
Diphenylguanidine	lb.	.30	@	.32½
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.37½	@	.40
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.53½	@	.61
Litharge	lb.	.18	@	.20
Methylenedianiline	lb.	.37½	@	.40
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
Safex	lb.	1.20	@	1.25
Tensilac, No. 39	lb.	.40	@	.42½
Tensilac, No. 41	lb.	.50	@	.52½
Thermio F	lb.	.50	@	.55
Thiocarbanilid, drums	lb.	.25½	@	.28½
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.62½
Ureka	lb.	.75	@	1.00
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Waxene	lb.	.30	@	.40
Z 88	lb.	.50	@	.60
Inorganic				
Lead, sublimed blue	lb.	.08¼	@	—
Lead, white	lb.	.08½	@	.08¾
Litharge, domestic	lb.	.09¼	@	.11
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.35	@	.36
Ultramarine	lb.	.06	@	.30
Browns				
Sienna, Italian	lb.	.05½	@	.12½
Umber, Turkey	lb.	.04½	@	.07
Greens				
Chrome, light	lb.	.30	@	.32
medium	lb.	.31	@	.33
dark	lb.	.34	@	.36
Chromium Oxide, bbl.	lb.	.34½	@	.35½
Reds				
Antimony crimson, 15/17	lb.	.40	@	.44
sulfur, free	lb.	.56	@	.66
golden 15/17 F.S.	lb.	.20	@	.25
Indian English	lb.	.08	@	.11
Domestic (Maroon)	lb.	.11	@	—
Oxymony	lb.	.13¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver, English	lb.	2.00	@	2.05
Whites				
Lithopone, Akcolith	lb.	.05 3/5	@	.06
Lithopone, Albalith	lb.	.05¼	@	.05¾
Lithopone, Azolith	lb.	.05¼	@	.05¾
Lithopone, Vanolith	lb.	.05¾	@	—
Titanox, f.o.b. St. Louis	lb.	.08½	@	.09
Titanium Calcium Pigment, f.o.b. St. Louis	lb.	.08	@	.08½
Zinc Oxide—American Process				
American Azo: ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.06⅞
Horsehead Brand: Special	lb.	.07	@	.07½
XX Green	lb.	.07	@	.07½
XX Red, lead free	lb.	.06½	@	.07
Kadox, black label	lb.	.10⅜	@	.10⅞
blue label	lb.	.09⅝	@	.09⅞
red label	lb.	.08	@	.08½
Zinc Oxide—French Process				
White seal	lb.	.11⅝	@	.11⅞
Green seal	lb.	.10⅜	@	.10⅞
Red seal	lb.	.09⅝	@	.09⅞
Yellows				
Chrome	lb.	.17	@	.17½
Ocher, French medium	lb.	.02	@	.03
domestic	lb.	.01⅝	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate, lump	lb.	.07½	@	.07¾
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.03½	@	.05
Barium Dust	lb.	.05	@	.06
Barytes southern off-color	ton	12.00	@	18.00
Western prime white	ton	28.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—
Blacks				
Arrow "Aerfloted"	lb.	.07	@	.12
Bone Black	lb.	.07	@	.08½
Carbon, compressed	lb.	.06½	@	.12
Carbon, uncompressed	lb.	.06½	@	.11
Disperso, f.o.b. Louisiana	lb	.061	@	—
Disperso, f.o.b. Texas	lb.	.06	@	—
Drop Black	lb.	.06	@	.10
Excello, compressed	lb.	.06½	@	.12
Fumonex	lb.	.06	@	.09
Gastex	lb.	.04½	@	.08
Lamp Black	lb.	.12	@	.40
Micronex	lb.	.07	@	.12
United carbon, fob Tex.	lb.	.06	@	—
Velvetex carbon	lb.	.04½	@	.06
Blanc fixe dry f.o.b. works	ton	80.00	@	90.00
Carrara filler	lb.	.01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Lexington	ton	10.00	@	22.00
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.08¾	@	.11
Mica, white water grnd.	lb.	.06	@	.08
Off color (biotite)	lb.	.05	@	.07
Rotten Stone powdered)	lb.	.02	@	.05
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.92	@	4.12
Talc, domestic	ton	12.00	@	15.00
Whiting, commercial	cwt.	1.00	@	1.25
English cliffstone	cwt.	1.75	@	2.00
Superfine	ton	10.00	@	12.00
Witco	ton	20.00	@	—
Zinc Carbonate	lb.	.09½	@	.10½
Zinc Stearate	lb.	.23½	@	.25

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	40.00	@	42.00
Pioneer-granulated	ton	50.00	@	52.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	80.00
M.R. (gran)	ton	35.00	@	80.00

SOFTENERS

Acids				
Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulfuric, 66°	cwt.	1.60	@	1.95
Tartaric, crystals	lb.	.38	@	.38½
Acids, Fatty				
Stearex	lb.	.15	@	.19
Stearic, double pressed	lb.	.17	@	.22
Alkalies				
Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	
Oils				
Corn, refined, bbls.	lb.	.09½	@	.10½
Cottonseed, crude		.07½	@	.09
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04¼
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.07¾	@	—
Niger	lb.	.07½	@	—
Para-Flux	gal.	.17	@	—
Petrolatum, white	lb.	.08	@	.08½
Pigmentaroil	gal.	.21	@	.26
Pine, steam distilled	gal.	.65	@	.70
destructively distilled	gal.	.63	@	.64
Witco Palm Oil	lb.	.11	@	—
Witco Softener (f.o.b. works)	lb	.02	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.06½	@	.07½
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb.	bbl.	9.32	@	—
Pigmentar	lb.	.038	@	.0446
Tar Retort, 50 gal.	bbl.	13.50	@	15.00
Solvents				
Acetone, pure	lb.	.12	@	.14
Alcohol denatured, No. 1 bbls.	gal.	.52	@	—
Benzol, 90%	gal.	.23	@	.25
Carbon bisulphide	lb.	.05½	@	.06¾
Carbon tetrachloride	lb.	.06¼	@	.07
Motor gasoline, steel bbls.	gal.	.16	@	—
Naptha, solvent	gal.	.35	@	.40
Turpentine, spirits	gal.	.55	@	.61
wood	gal.	.53	@	—
destructively distilled	gal.	.40	@	.43
Waxes				
Beeswax, white	lb.	.51	@	.53
Carnauba	lb.	.35	@	.36
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.06½	@	.07
Ozokerite, black	lb.	.24	@	.26
green	lb.	.26	@	.30
Paraffin (c. l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.03¾	@	
White crude scale 124/126	lb	.04	@	
Refined, 125/127	lb.	.05¾	@	
Refined, 128/130	lb.	.05½	@	
Refined, 135/137	lb.	.07¾	@	
Refined, 138/140	lb.	.08¼	@	

ANTI-OXIDANTS

Albasan	lb.	.70	@	.75
Antox	lb.			
Neozone	lb.			
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.64	@	—
VGB	lb.	.55	@	.66

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03¼	@	.03½
Sulfur flour, Refined, 100% pure (bags)	cwt.	2.40	@	2.75
Commercial (bags)	cwt.	1.75	@	2.10

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

PUBLICATION of the statistics compiled from the quarterly questionnaire of the Rubber Manufacturers Association showed the usual discrepancies in domestic consumption of crude and reclaimed rubber with the monthly reports of the association. The quarterly statement, which is regarded as the more accurate, shows that American consumption for the first nine months of 1929 was 381,603 long tons, while the total of the association's monthly reports from January through September is equal to 383,814 long tons.

The final report of the Department of Commerce on October imports showed only 38,163 tons of crude rubber brought into this country, as compared with the Rubber Manufacturers Association estimate of 43,725 tons. Net imports were only 35,549 tons, according to the government figures, a fact which may explain why the reports of stocks on hand did not rise in proportion to the high R. M. A. import estimate.

That manufacturers have been successful in reducing their finished goods inventories is shown by the fact that their stocks of casings on September 30 were the lowest since December, 1928, while their stocks of tubes were lower, with a single exception, than at any time since 1925. This was reflected in the reports of tire dealers' stocks as of October 1, which were higher than ever recorded on any previous October survey.

London and Liverpool stocks, which were figured at 65,460 tons on November 9, had increased by November 30 to 70,290 tons, the heaviest amount since October, 1927.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	809,144	185,060,804	26.72	8,772	5,672,319	28.87	800,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,715,488	39.76	398,483
1928	439,781	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1927:							
Jan.	43,340	36,753,719	37.86	1,525	1,444,734	42.28	41,815
Feb.	28,337	23,110,257	36.41	2,451	2,277,297	41.47	25,886
Mar.	35,515	28,693,016	36.07	2,763	3,249,665	52.50	32,752
Apr.	46,202	37,321,505	36.06	1,575	1,428,425	40.48	44,627
May	36,518	30,984,377	37.88	2,782	2,501,562	40.14	33,736
June	33,045	27,850,014	37.62	1,775	1,550,592	39.00	31,270
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	75.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	38,592	27,395,428	31.69	2,469	2,014,196	36.43	36,123
Dec.	30,737	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,107	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,835	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,058	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,773,401	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	50,604	20,380,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,386	1,349,690	21.24	48,325
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.73	40,520
Aug.	37,222	16,530,090	19.83	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.							
Dec.							

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1922	1923	1924	1925	1926	1927	1928	1929
Jan.	16,988	30,106	29,058	29,638	32,196	31,518	34,403	43,002
Feb.	14,767	30,149	25,736	19,761	31,136	30,137	33,702	41,594
Mar.	21,408	36,629	28,385	33,498	32,936	36,141	35,688	44,730
Apr.	19,294	29,085	27,129	34,139	32,696	35,871	32,772	47,531
May	23,246	36,155	25,845	35,322	29,364	34,592	37,333	49,233
June	31,713	24,272	22,753	35,822	28,598	33,801	37,676	43,227
July	24,522	17,685	23,396	36,053	27,577	29,219	37,407	41,526
Aug.	29,631	20,359	28,982	35,909	34,533	33,460	42,927	38,274
Sept.	24,410	17,594	31,497	31,691	32,904	27,214	39,882	34,707
Oct.	26,881	21,321	31,520	29,047	29,836	26,790	40,857	34,800
Nov.	24,950	20,437	27,289	28,853	28,080	26,792	37,461	
Dec.	25,070	31,902	27,199	28,748	26,293	25,492	31,232	
Totals	282,560	305,694	328,769	388,481	366,149	371,027	441,340	

Figures on Quarterly Basis

Quarter	1922	1923	1924	1925	1926	1927	1928	1929
Jan./Mar.		96,776	87,609	95,263	94,301	99,216	103,558	128,565
Apr./June	127,260	89,493	75,674	104,099	87,109	103,242	103,500	139,992
July/Sept.		55,621	83,813	99,493	93,793	89,210	117,573	113,746
Oct./Dec.	155,067	63,617	92,656	85,789	83,212	80,860	117,597	
Totals	282,427	305,507	339,752	384,644	358,415	372,528	442,227	381,603

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
Sept. 7	8,313	1,691	1,256	38	11,298
Sept. 14	7,318	1,080	1,674	37	10,109
Sept. 21	7,514	533	1,549	15	9,611
Sept. 28	6,861	1,975	1,456	140	10,432
Oct. 5	7,913	1,748	1,632	52	11,345
Oct. 12	6,639	1,216	1,462	65	9,382
Oct. 19	6,991	590	1,819	383	9,783
Oct. 26	6,194	1,406	1,558	242	9,400
Nov. 2	7,776	960	2,012	51	10,799
Nov. 9	7,103	648	1,470	106	9,327
Nov. 16	5,584	571	1,960	52	8,167
Nov. 23	6,109	919	1,711	78	8,817
Nov. 30	6,672	1,404	2,205	9	10,290

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1927																																
May	—	40½	40¾	40½	41	41	40¾	—	40¾	40¾	40¾	40¾	40¾	40¾	—	40½	40¾	40¾	40¾	40¾	40¾	—	40¾	41	41	40½	40¾	40¾	—	—	40¾	40¾
June	40¾	40¾	40¾	40¾	—	—	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	—	39½	—	39½
July	35½	—	—	35½	35½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	34½	—	34½
August	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	35½	34½	34½	34½	34½	34½	34½	34½	34½	34½	35½
Sept.	34	—	—	33½	33½	33½	33½	33½	33½	33½	33½	34	34	34	34	34	34½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½
Oct.	33½	33½	33½	35½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	35½	35½
Nov.	35½	35½	35½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½	36½
Dec.	40½	40¾	40¾	—	40¾	—	—	40½	40	40½	—	—	40½	40	39½	39½	40	40	40	40	40½	—	41	41	41	41	41	41	41	41	41	41
1928																																
January	—	41¾	41¾	41¾	41¾	41	41	—	40¾	40½	40¾	40¾	40¾	40½	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾
February	87½	87¾	87¾	—	—	86¾	—	86¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾
March	29	28¾	28¾	28¾	—	28¾	26½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½	25½
April	—	27½	27½	21½	21¼	—	—	20	18¾	18¾	18½	18½	18½	24¼	24¾	18¾	18½	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
May	17½	18½	17¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
June	19¾	19¾	—	18½	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
July	19½	19½	19½	19¾	19¾	19	19	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
August	—	18¾	19¾	19¾	19¾	19	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
September	—	—	—	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
October	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
November	18¾	18¾	18¾	17¾	17¾	17¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
December	17¾	—	17¾	17¾	17¾	18¼	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17½	17½	17½	17½	17½	17½
1929																																
January	—	18¼	18¼	18¼	18¼	18¼	18¼	18¾	18½	18¾	20	20	20	19¾	19¾	20	20¾	20¾	20¾	20¾	20¾	20¾	20½	21¾	22	22	22	22	21¾	21¾	22¼	20½
February	22	22	22	21¾	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	23	24¾	25¼	25¼	25¼	25¼	25¼	25¼	25¼	25¼	25¼	26½	26½	26½	26½	26½	26½	26½	24
March	26	26	26	26	26	26	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	23	23	22½	22½	22½	22½	22½	24½
April	23	23¼	22¾	22¾	23½	23½	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	21¾	21¾	21¾	21¾	21¾	21½
May	19¾	19¾	19¾	19¾	19¾	20¾	20¾	21¾	21¾	21¾	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20½
June	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
July	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Aug.	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Sept.	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Oct.	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Nov.	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Dec.	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	86.30
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.15
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	—
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	—

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Sept.	Oct.	Nov.	Dec.	Day	Sept.	Oct.	Nov.	Dec.
1	—	9⅝	8⅞	—	17	10¼	9¾	—	—
2	10¼	9½	8⅝	8	18	10¼	9¾	8⅛	—
3	10¼	9⅝	—	7⅞	19	10¼	9¾	8	—
4	10¼	9½	8½	—	20	10¼	—	8⅛	—
5	10⅛	9¾	8½	—	21	10¼	9¾	8⅛	—
6	10⅛	—	8⅜	—	22	—	9⅝	8⅛	—
7	10⅛	9¾	8¼	—	23	10¼	9⅝	8⅛	—
8	—	10	8¼	—	24	10¼	9⅝	—	—
9	10¼	10	8⅛	—	25	10⅛	9⅛	8⅛	—
10	10¼	9⅞	—	—	26	10	9⅛	8¼	—
11	10¼	9⅞	8⅛	—	27	10	—	8⅛	—
12	10¼	10	7⅞	—	28	9¾	9⅛	8	—
13	10¼	—	7⅞	—	29	—	9	8	—
14	10¼	10	8⅜	—	30	9¾	9⅛	8	—
15	—	10	8⅜	—	31	—	9⅛	—	—
16	10¼	9⅞	8⅛	—					

Average Monthly Price Per Pound

Month	1927 Pence	1928 Pence	1929 Pence	Month	1927 Pence	1928 Pence	1929 Pence
Jan.	19.410	19.310	9.942	Aug.	17.202	9.300	10.505
Feb.	19.021	15.713	11.875	Sept.	16.293	8.530	10.160
Mar.	20.125	12.736	12.135	Oct.	16.366	8.807	9.620
Apr.	19.897	8.864	10.490	Nov.	18.159	8.596	8.442
May	19.769	8.845	10.717	Dec.	19.690	8.570	—
June	17.880	9.293	10.580	Average for Year	18.375	10.656	—
July	16.770	9.312	11.065				

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Nov.	Dec.	Day of Month	Nov.	Dec.	Day of Month	Nov.	Dec.
1	18.10	—	11	17.30	—	21	17.75	—
2	18.05	17.30	12	17.00	—	22	17.55	—
3	—	17.55	13	17.20	—	23	17.60	—
4	17.90	—	14	17.30	—	24	—	—
5	—	—	15	17.50	—	25	17.55	—
6	17.30	—	16	17.75	—	26	17.40	—
7	17.35	—	17	—	—	27	17.30	—
8	17.60	—	18	17.50	—	28	—	—
9	17.50	—	19	17.75	—	29	17.40	—
10	—	—	20	17.80	—	30	17.35	—
						31	—	—

Average Monthly Price Per Pound

Month	1927 Cents	1928 Cents	1929 Cents	Month	1927 Cents	1928 Cents	1929 Cents
Jan.	13.42	19.12	20.22	Aug.	20.04	19.28	18.62
Feb.	14.10	18.40	20.21	Sept.	21.95	18.67	18.83
Mar.	14.32	19.38	20.19	Oct.	20.22	19.62	18.46
Apr.	14.75	20.63	20.29	Nov.	20.22	19.84	17.53
May	16.07	21.58	19.41	Dec.	19.58	20.22	—
June	16.85	21.50	18.74	Average for Year	17.49	19.97	—
July	18.00	21.36	18.62				

Stock of Crude Rubber in the U. S.

(All Quantities in Long Tons)

At	ON HAND			AFLOAT			ON HAND AND AFLOAT		
End of	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	76,172	110,244	76,342	45,312	41,256	78,596	121,484	151,500	154,938
Feb.	91,186	108,955	90,058	42,166	43,316	63,825	133,352	152,271	153,883
March	85,740	114,061	100,536	49,600	39,324	56,476	135,340	153,385	157,012
April	92,757	113,083	107,659	38,963	33,986	55,409	131,720	147,069	163,068
May	94,568	105,356	97,192	44,181	34,374	55,404	138,744	139,730	152,596
June	89,250	90,198	92,061	47,233	40,001	46,035	136,483	130,119	138,096
July	98,469	83,242	92,535	40,687	42,304	38,858	139,056	125,546	134,393
Aug.	96,148	68,994	90,769	40,937	51,875	41,618	137,085	120,869	132,387
Sept.	97,829	68,851	84,362	37,966	48,566	49,480	135,793	117,417	133,842
Oct.	97,452	66,421	88,483	42,804	41,571	49,835	140,256	107,992	138,318
Nov.	101,034	61,956		37,076	68,119		138,110	130,075	
Dec.	100,130	66,166		47,938	68,764		148,068	134,930	

(Rubber Manufacturers' Association figures raised to 100%.)

Stock of Crude Rubber in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1927	1928	1929	At end of	1927	1928	1929
Jan.	54,994	66,524	25,191	July	63,717	35,429	30,080
Feb.	58,826	62,964	25,554	Aug.	64,491	32,084	35,605
Mar.	63,055	58,272	28,214	Sept.	68,236	31,440	
Apr.	66,897	53,425	31,368	Oct.	69,569	24,207	
May	67,169	44,628	31,290	Nov.	67,050	17,775	
June	63,902	38,756	31,025	[1]Dec.	63,793	19,815	

At End of Recent Weeks

Stocks in London

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1929					
January	21,953	23,016	23,547	24,423	———
February	25,389	25,413	24,757	25,005	———
March	25,441	25,920	26,442	27,656	28,077
April	28,934	30,446	30,503	31,218	
May	31,580	31,127	30,955	30,893	———
June	31,539	31,635	31,127	30,617	30,982
July	29,996	30,661	30,790	30,167	
August	30,937	31,444	33,573	34,651	35,605
September	36,620	37,901	40,151	42,077	
October	43,478	44,339	45,711	46,819	
November	48,092	49,302	50,068	51,012	52,538
December					

Stocks in Liverpool

1929					
January	2,953	3,520	3,505	3,824	———
February	3,860	4,106	4,086	4,151	———
March	4,255	4,136	4,100	4,333	4,433
April	4,442	4,591	4,521	4,779	———
May	4,614	4,384	4,216	4,665	———
June	4,642	4,750	4,733	4,515	4,628
July	4,398	4,547	4,757	4,739	———
August	4,662	4,481	5,993	7,285	7,560
September	8,351	8,660	9,780	10,161	———
October	10,795	11,571	11,788	12,665	———
November	14,272	16,158	17,543	17,479	17,752
December					

Rubber in Singapore and Penang

(Stocks held by Dealers—Quantities in Long Tons)

End of	1927	1928	1929	End of	1927	1928	1929
Jan.	25,440	25,868	29,617	July	22,558	18,663	33,859
Feb.	26,766	22,867	32,373	Aug.	25,764	18,971	30,884
Mar.	27,844	20,538	29,437	Sept.	25,178	14,898	32,138
Apr.	24,543	16,946	26,474	Oct.	25,790	12,149	33,770
May	25,133	17,437	30,764	Nov.	28,369	29,188	———
June	21,898	18,207	30,403	Dec.	25,798	32,895	———

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,620	0.6	1926	24,199,524	78.8
1924	21,863,311	19.7	1927	19,700,003	79.1
1925	26,001,664	66.3	1928	24,247,282	81.6
1929					
January	1,835,207	79.4	July	1,896,666	78.2
February	2,265,024	80.8	August	1,570,099	79.4
March	2,613,389	80.4	September	2,110,003	80.7
April	2,729,899	81.3	October	1,647,350	76.4
May	2,574,224	76.5	November		
June	2,184,219	75.3	December		

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1928	1929	MONTHS	1928	1929
January	20,938,000	22,602,000	July	30,960,000	36,860,000
February	21,136,000	22,776,000	August	33,148,000	37,759,000
March	24,041,000	28,495,000	September	29,691,000	34,193,000
April	25,712,000	32,019,000	October	30,610,000	32,816,000
May	27,355,000	34,117,000	November	26,222,000	
June	29,022,000	33,163,000	December	26,644,000	

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	4,965	5,358	6,722	4,932	5,394	6,626	10,432	9,949	13,712
Feb.	5,095	6,363	6,912	4,458	5,031	5,282	11,075	11,721	15,495
Mar.	6,276	6,819	7,519	5,701	5,731	6,708	11,563	12,389	16,351
Apr.	6,299	6,178	7,884	5,701	5,812	7,294	12,122	12,71.	16,929
May	6,151	6,759	8,145	5,657	6,457	7,184	12,462	13,024	17,849
June	6,202	6,692	7,304	6,253	7,117	7,254	12,462	12,162	17,957
July	5,087	6,498	6,475	5,973	7,895	7,855	11,326	11,157	15,830
Aug.	5,752	7,469	5,806	6,393	8,403	7,845	10,721	10,034	14,226
Sept.	4,822	6,802	4,758	5,717	7,145	5,998	9,722	9,765	12,875
Oct.	4,773	7,326		4,799	5,717		9,665	11,520	
Nov.	4,502	6,075		4,306	4,998		10,136	12,579	
Dec.	4,497	5,605		4,165	4,591		10,264	13,624	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Jan.	5,337	5,441	6,517	6,016	6,072	7,242	15,585	12,982	15,886
Feb.	5,658	6,895	6,769	5,120	5,431	5,278	16,075	14,650	16,999
Mar.	7,184	6,231	7,466	6,157	5,731	6,737	17,096	15,573	17,750
Apr.	7,373	6,661	7,634	6,359	5,702	7,164	17,801	16,638	18,134
May	6,737	7,168	7,660	6,140	6,300	7,038	18,389	17,702	18,928
June	6,306	6,953	6,978	6,832	7,136	6,950	17,858	17,159	18,741
July	5,284	6,674	6,178	7,070	8,729	8,113	16,004	14,974	16,332
Aug.	6,480	8,343	5,846	7,983	9,350	8,183	14,664	13,931	14,157
Sept.	5,651	7,103	5,536	6,758	7,154	6,250	13,511	13,543	13,424
Oct.	5,065	6,929		5,024	5,662		13,539	15,285	
Nov.	4,775	5,592		4,723	5,002		13,585	15,748	
Dec.	4,969	5,184		4,712	4,858		13,692	16,117	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1922	2,547,208	2,302,923	244,285	102,053	94,904	7,149	2,649,261
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
Jan.	225,039	199,032	26,007	8,463	6,705	1,758	233,502
Feb.	323,368	290,830	32,358	12,504	10,315	2,189	335,872
March	412,825	371,408	41,417	9,724	7,478	2,246	422,549
April	409,948	364,877	45,071	24,240	20,546	3,694	434,188
May	425,990	375,798	50,192	33,942	29,764	4,178	459,932
June	396,967	356,439	40,528	28,399	25,341	3,058	425,366
July	390,445	337,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,096	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	28,486	2,801	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	379,942	321,195	58,747	14,523	8,975	5,548	394,465
Nov.							
Dec.							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[4]	World Total[7]
1923	252,016	70,432	181,584	89,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,955
1924	259,706	108,524	151,182	89,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,368
1925	316,823	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1927:															
Nov.	28,277	19,860	8,417	4,464	1,277	1,241	591	600	4,127	6,587	14,395	683	2,369	1,627	46,378
Dec.	32,185	17,865	14,320	4,130	1,395	946	592	664	5,763	7,878	13,438	1,191	3,340	1,444	55,101
1928:															
Jan.	27,789	16,618	11,171	3,830	1,605	842	581	525	4,851	7,988	11,774	1,100	2,278	1,026	47,565
Feb.	28,848	12,911	15,937	4,947	1,081	667	581	536	4,052	6,757	8,630	787	1,612	1,276	46,860
Mar.	27,879	10,508	17,371	3,683	775	645	581	269	3,999	5,825	9,690	700	2,750	1,211	47,499
Apr.	20,139	9,335	10,804	3,233	789	630	494	258	3,998	5,040	5,499	736	1,014	1,323	33,310
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,855	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	693	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,732	450	56,936
Sept.	29,769	11,239	18,530	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,078
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	732	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,664	873	600	461	5,640	8,067	11,076	850	2,134	642	79,439
Feb.	47,926	12,103	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	520	73,952
Mar.	49,448	14,553	34,895	6,583	1,413	758	601	499	5,515	6,620	10,629	658	2,332	786	71,289
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	650	1,922	733	66,824
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	608	1,398	548	60,868
July	46,454	15,071	31,383	5,457	974	1,247	500*	462	6,422	7,192	13,995	555	1,457	543	70,187*
Aug.	50,441	15,469	34,972	6,079	685	993	500*	431	4,644	7,298	10,782	545	1,563	499	68,991*
Sept.	53,484	12,392	41,092	7,961	384	832	500*	406	4,708	7,517	10,149	755	1,566		
Oct.	47,937	12,516	35,421	8,411	812	1,047	500*	485	4,697	8,295	10,512	893	1,606		
Nov.	46,279	11,204	35,075												

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States*	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,378
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,648	172	-8,807	1,778	589	567	395,885
1923	360,372	12,700	27,392	18,519	18,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,846	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,649
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	596,695
1927:															
September	29,801	7,800	1,956	2,891	1,850	2,025	684	518	772	552	-83	451	155	272	49,694
October	27,671	5,888	3,479	4,202	1,790	1,966	1,021	1,075	908	465	156	401	153	363	49,538
November	36,123	1,687	3,661	4,209	1,916	1,575	1,167	1,312	836	749	298	474	246	317	54,570
December	28,082	309	4,696	3,108	2,302	2,710	1,462	1,453	1,242	784	-202	514	268	300	47,028
1928:															
Jan.	37,120	1,921	1,764	2,485	2,290	1,361	760	755	802	589	52	261	335	376	50,871
Feb.	30,926	3,143	2,526	2,984	2,553	1,248	437	783	616	599	98	307	296	297	46,813
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	398	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	133	346	251	182	40,063
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	285	56,457
Oct.	41,667	—934	3,728	4,336	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	837	544	31	337	252	282	46,938
Dec.	40,781	3,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,331	5,179	5,001	4,613	2,908	2,727	1,259	684	1,131	627	113	226	115	356	86,275
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,233
June	38,676	4,787	6,814	3,948	3,075	1,593	1,624	695	2,215	672	687	507	24	420	65,737
July	40,914	4,993	4,839	3,559	3,205	2,388	2,023		2,918	1,039	253	519	30	465	
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908		724	902	254	429	25	319	
Sept.	32,171	17,010	3,889	4,691			1,224		853	672	253				
Oct.	35,840	16,111		3,355											

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. *United States imports of guayule are not included in this compilation: such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 743 tons in the first 8 months of 1929.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620(2)	64,877,000
1926	29,328,000	183,312,000	12,253,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1928:				
January	2,177,000	17,682,000	3,431,000	$5,630,000
February	2,575,000	19,181,000	3,628,000	5,838,000
March	2,853,000	22,583,000	3,747,000	6,675,000
April	2,416,000	18,575,000	2,928,000	5,406,000
May	2,744,000	21,597,000	3,519,000	6,274,000
June	2,953,000	18,763,000	3,321,000	6,126,000
July	3,447,000	17,620,000	3,168,000	5,157,000
August	4,613,000	21,289,000	3,461,000	6,306,000
September	4,966,000	21,451,000	2,725,000	5,393,000
October	5,914,000	21,932,000	2,297,000	5,837,000
November	4,173,000	18,686,000	2,649,000	5,201,000
December	2,348,000	15,811,000	2,771,000	5,271,000
1929:				
January	2,828,000	19,975,000	3,876,000	6,038,000
February	3,095,000	18,979,000	2,869,000	6,135,000
March	3,952,000	17,226,000	2,746,000	7,013,000
April	4,000,000	17,256,000	2,601,000	7,035,000
May	4,860,000	19,541,000	2,916,000	7,189,000
June	4,409,000	20,007,000	2,502,000	6,792,000
July	4,260,000	19,315,000	1,295,000	6,306,000
August	5,085,000	23,095,000	2,948,000	6,792,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,088	8,332	2,213,964	2,900	1,068,698
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	351,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928:	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
July	191	100,342	123	46,747	378	113,295	81	37,344
Aug.	—	—	399	165,460	451	126,962	147	60,738
Sept.	—	—	60	38,198	2,028	713,736	125	56,768
Oct.	—	—	121	59,358	429	129,065	239	94,570
Nov.	—	—	59	41,119	472	140,116	88	35,409
Dec.	—	—	83	58,311	522	156,154	145	59,911
1929:								
Jan.	—	—	46	30,374	484	152,260	138	62,950
Feb.	—	—	82	70,209	823	255,594	40	19,806
Mar.	—	—	90	75,444	428	122,026	1	1,140
Apr.	83	38,241	163	93,240	1,086	315,621	1	1,086
May	125	57,260	70	67,891	752	212,400	76	24,053
June	145	62,808	31	26,038	802	248,143	77	25,612
July	200	86,175	49	46,440	572	180,065	14	5,807
Aug	190	80,443	58	47,769	575	171,733	—	—
Sept.	107	51,156	38	30,327	913	279,225	—	—
Oct.	200	79,968	58	43,756	636	181,421	—	—

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1919	81,366	73,535	36.3	.....	1924	80,079	76,072	22.4	.....
1920	86,395	75,297	38.4	.....	1925	132,936	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1927:									
Jan.	16,526	12,374	39.3	25,903	July	15,488	13,842	47.4	26,599
Feb.	15,860	14,424	47.8	27,291	Aug.	15,109	15,836	47.3	25,157
Mar.	16,788	13,528	37.4	27,124	Sept.	14,392	14,790	54.3	23,429
Apr.	14,483	16,677	46.5	25,712	Oct.	16,127	17,292	64.5	22,176
May	16,159	15,754	46.1	26,419	Nov.	15,477	14,876	55.5	21,728
June	16,652	15,547	46.0	25,811	Dec.	16,083	13,431	52.7	24,980
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,305
Feb.	15,291	18,670	55.4	20,848	Aug.	19,049	17,890	41.7	15,881
Mar.	17,069	20,680	57.9	19,558	Sept.	18,693	17,795	44.6	17,991
Apr.	15,393	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,137	Nov.	18,245	18,380	49.1	22,399
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.3	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,385	23,176	47.1	19,479	Nov.				
June	18,416	18,141	42.0	17,980	Dec.				

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927 and 9,577 tons in 1928.

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